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II.—*Visit to the Sources of the Takutu, in British Guiana, in the year 1842.* By ROBERT SCHOMBURGK, K.R.E. [Communicated from the Colonial Office.]

VARIOUS circumstances delayed the departure of the expedition from George Town ; additional impediments occurred at Pirara ; so that the month of March had approached, or, in other words, the dry season had fully set in before it could start. It was impossible at this advanced season to pursue my first plan of ascending the river Cotinga, in order to reach the culminating point of the system of mountains called Pacaraima\* by recent geographers, which, in connexion with the Parima mountains of the Orinoco, form the water-shed between the affluents of that river and those of the Essequibo and the Amazon. I selected, therefore, the river Takutu for our exploration. According to the information which I had collected from Von Martin's and Humboldt's works, it appeared no easy task.

A promise had been made to me to send a canoe to the mouth of the Pirara to transport the most indispensable instruments ; but several weeks elapsed and there was no word of its arrival. I was aware that if my plan of tracing the Takutu to its source was to be executed before the setting in of the tropical winter, or the great rainy season, no time was to be lost. I engaged therefore a number of Macusi Indians to accompany us as carriers and guides, and set out for the mouth of the Pirara on the 24th of March. My party consisted of Mr. Fryer, acting as assistant surveyor ; Mr. Goodall, the draughtsman ; Mr. Richard Schomburgk, who, at the request of the Prussian government, had been allowed to accompany the expedition in order to make collections for the Royal Prussian Museum and the Botanical Garden at Berlin ; and nine canoe-men, partly Europeans, who were permanently engaged ; Sororeng, who accompanied me in 1839 to London, was, as on former occasions, our interpreter.

There was something interesting in our departure from the village, which had been our head-quarters for almost two months. All was bustle ; the Indians fixed their burdens, which in no instance ought to be heavier than 30 lbs. Women and children took leave ; and the canine race, far too important to be overlooked on such an occasion, showed by their loud barking their belief that they were to be of the party. It had, however, been differently decreed by their owners ; and the shrill voice of the squaw was heard above all recalling the dogs, which in spite of cudgel and throwing of stones, try to outflank her and join the travellers.

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\* Humboldt's Narrative, vol. v. pp. 797, 841, 857 ; vol. vi. p. 514.

We followed the small path one by one in Indian file, and soon stood at the ford of the Pirara, where the river issues from the lake. The water at that time scarcely reached our knees.

We selected a different path from the one I had followed on a former occasion, and passed the small lake Venturu, now almost dry, but nevertheless frequented by numerous *vicissi* (*Dendrocygna viduiata*) and Muscovy ducks, which, disturbed by our approach, rose from their feeding place, and encircled the small basin of water in rapid flight. Were it not for the two mountain chains, Canuku and Paraima, which at the distance of 20 miles bound the view to the S. and N., the march across the savannahs would be monotonous in the extreme. During the dry season no bird, scarcely an insect, enlivens the scene; a few stunted shrubs, almost leafless, and some grass scantily cover the savannahs; the reddish soil, in consequence of the strong E. wind, and want of moisture, gapes in numerous crevices; clouds of dust raised by the strong breeze ascend the air in columns, envelope the traveller incessantly, and almost blind those who are not on their guard against the small particles entering their eyes. At noon the heat rises on these savannahs to 120° and 125° Fahr. in the sun. The *mirage* plays upon their surface, and in the distant horizon the trees and other objects appear to hover in the air. We were glad when (soon after 3 P.M.) we struck the river Pirara, and were able to quench our thirst. We had marched 11 or 12 miles without finding any palatable water. The best of our pedestrians reached the mouth of the river at five o'clock that afternoon; some did not come up till next morning. It is a distance of 17 English miles from Pirara, by no means an easy march under the tropics.

We encamped near the junction of the Pirara with the Mahu. Two small corials which we procured required a thorough repair to fit them for use; and, besides, a delay of at least three days was required to observe what effects the journey over the savannahs had produced upon the chronometer.\*

*March 27th.*—A serious accident which occurred to-day impressed the superstitious crew with an idea that the expedition would be an unfortunate one. Two of the canoe-men (Europeans) went out to shoot for their own amusement, without requesting permission to leave the camp. On their return the gun of one of them, Petry by name, got entangled in some withes, and he dragging it forcibly towards him, the cock of the percussion-lock was raised, and the gun went off, lodging the whole charge in his back below the shoulder-blade.

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\* The Chronometers—Frodsham, 389—Arnold, 6062—were carried by one of the most careful of our canoe-men in a small tin canister, which he slung by a strap across his shoulder.

This unfortunate accident detained us till Saturday the 2nd of April, when, by advice of Mr. Fryer, Petry was carried upon a stretcher to Pirara.

The longitude of our camp was, according to the two chronometers,  $15^{\circ} 3''$  (in arc) W. of the village of Pirara. The longitude of the village of Pirara not having been satisfactorily determined as yet, I have adopted it as the first meridian of the survey. On my previous expedition under the Royal Geographical Society, the chronometers which I had with me gave 14 miles W.; I have more confidence in the present result—

Arnold 6062 gives  $59^{\circ} 50'$  (in time) W. of Pirara.

Frodsham 389 „  $1^{\circ} 0'' 88$  „ „

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Difference . .  $1'' 38$

In order to employ the time which the accident caused us to remain at the mouth of the Pirara in the most useful manner, I ascertained the distance of some of the most remarkable mountains in the Canuku and Pacaraima chain visible from the camp, while the men were busy repairing the corials and strengthening them by additional knees. A tree of the natural order of Dilleniaceæ, the *Curatella Americana*, furnished us natural knees for this purpose. It is almost the only tree that is to be found upon the savannahs. It is stunted in its growth, and its branches are so crooked that besides knees for boat-building, it might be used for military saddles; its leaves are rough and scabrous, and the Indian uses them as our tradesmen would employ sand-paper—to polish his blow-pipe (cura), bow, war-club, &c. The tree is called, from its being used in polished the cura, 'curata-kie.'

On the margin of the Pirara, a *Eugenia* attracted my attention, with fruit as large as a damson. This species appears to produce a larger fruit than any other of this extensive genus. I observed two varieties—one purple, the other yellowish with a red spot. It has an agreeable acid; and the Macusi Indians, who mix it with their drink, call it Casami.

The heat was extreme during the time that we remained encamped near the mouth of the Pirara. Although the thermometer was placed under the tent, which was surrounded by shadowy trees, it rose, between two and three in the afternoon, from  $97^{\circ}$  to  $100^{\circ}$  Fahr.; its lowest stand at six o'clock in the morning was  $73^{\circ}$ . Our trigonometrical operations on the savannahs were therefore extremely fatiguing. A delicious refreshment was found on some spots of the savannahs which were covered with a small plant (*Psidium turbiniflorum*, Mart.) the berries of which had the aromatic flavour of strawberries. We did not spare the fruit whenever we fell in with it the Macusi Indians call it Piriko.

Another species of a larger size, and approaching in its appearance to the guava (*Psidium pomiferum*) only that the shrub is scarcely above 3 or 4 feet in height, is called Canung. I was rather astonished to hear so far inland the larger shrike, which is so common near the coast, that whoever has visited George Town will seldom forget its incessant cry, approaching in sound to “qu’est-ce-que-dit,” from which the bird has received its trivial name. It is probably the *Psaris Cayanus* (Cuv.); and our Macusi called it from its cry “Setté-qui.”\*

*April 2nd.*—Mr. Fryer set out with Petry to Pirara, with directions to remain in attendance on him till he was out of danger. This deprived me of the only assistant in my manifold occupations; but I was too well aware that without some surgical assistance Petry would have little chance of recovery.

The men had repaired three small corials, which, though they afforded room for only two or three persons each, were calculated to convey my instruments more safely than the Indians could carry them. I had restricted myself to the most indispensable:—a sextant, by Jones; an artificial horizon; a new telescope, by Troughton and Simms; a prismatic compass; an horizon with levelling screws; Hansteen’s apparatus, with two horizontal needles, which Colonel Sabine kindly lent to me;† a chain of 100 feet, divided in decimals, and compared with a standard chain by Troughton and Simms; three thermometers, by Troughton and Simms, compared with the standard; two pocket chronometers—Frodsham, No. 389, and Arnold, No. 6062.‡

These instruments having been embarked in the canoes, which were entrusted to the guidance of the coxswain, we forded the

\* MEAN OF THERMOMETRICAL OBSERVATIONS NEAR THE MOUTH OF THE PIRARA.

Period. 1842.	6 A.M.	9 A.M.	12 A.M.	3 P.M.	6 P.M.	Max.	Minim.
March 27th to } April 2nd }	75.72	83.13	91.82	94.92	86.07	98.	73.

The thermometer had been compared with an excellent standard thermometer of Troughton and Simms. A strong easterly wind blows generally from sunrise to eight or ten in the evening.

† They are the needles L (a) and L (b) mentioned in Table LII. of the Magnetic Survey of Great Britain.

‡ Knowing from experience how easily the mountain barometer is put out of order during an overland journey, and desirous to be able to carry this instrument on my next expedition to Roraima, I left it in Pirara. This precaution was unavailing, although great care had been taken in putting it up; Mr. Fryer, entering the house one day, which during my absence had been unoccupied, found the instrument upset and broken. Fortunately a barometer by Bunton, No. 430, compared with the barometer of the Royal Observatory at Paris, and that of the Royal Society in London, remained in good order.

Pirara, and continued our march to the junction of the Mahu with the Takutu over savannahs as monotonous as those I have previously described.

The Takutu, like other rivers which flow through the savannahs, is fringed with trees which show a more luxuriant vegetation than the generality of the vegetable productions on these plains. The wood through which we had to pass before we reached the river, was nearly a mile in breadth, interspersed with high trees, and an arborescent shrub, which, like the mangrove (*Rhizophora*) of the sea-shore, had taken root in the alluvial soil, and formed dense thickets almost down to the verge of the river. Its branches, like those of the celebrated banyan-tree, throw down roots into the soil, and form in vegetable arches, which scarcely admit the sun's rays, and under which we passed, as if under the dubious light of an early misty morning. The large trees belonged mostly to the genera *Cordiaceæ*, *Malpighiæ*, and *Mimoseæ*. The first was the *Cordia tetraphylla* of Aublet, the table-tree of the colonists. The second was a *Malpighia*, a tree of considerable height and extent. Its berries, of a deep orange, were ripe, and a great number lying on the ground. Our Indians eagerly collected and ate them, apparently with much relish, although to our palates they appeared austere. The handsomest tree, however, was a *Mimosa*. Its trunk was of a light ash-grey, its branches spread to a great extent, and its fine pinnated foliage, of a vivid green, added to its remarkable appearance.\* A *Loranthus*, with bright scarlet flowers, covered a great many of the trees near the mouth of the river, and presented a strong contrast with the white flowering *Desmanthus*.

A site for our camp was selected on the left bank of the Mahu, at its junction with the Takutu. I have elsewhere observed † that the Takutu appears more like a tributary of the Mahu than the recipient of the latter, and in reality its breadth is less. A trigonometrical measurement in 1838 gave me for the width of the Takutu 192 yards before it receives the Mahu, and the latter was found to be 263 yards wide at its mouth.

As I had not previously determined the latitude of the junction of these two rivers, I determined to do so now by astronomical observations. We remained, therefore, several days in this camp. The sky was much overcast at night; hour-angles in the morning, however, gave me as difference of longitude between Pirara and the confluence of the Mahu and Takutu 1 m. 36·11 s. W. in time. The latitude is 3° 35' 8" N.‡ That beautiful constel-

\* I am not acquainted with the botanical name of this tree, of which there are no specimens among my former collections: it had neither blossom nor fruit when we visited the Takutu.

† Journal of the Royal Geographical Society, vol. x.

‡ This is merely approximate; I have not yet had time to calculate the mean of

lation, the Southern Cross, afforded me the best opportunity for circum-meridian altitudes.

The very natives have been struck by this constellation; and the Macusi Indian dedicates it to the Spirit of the Savannah. He asserts that when the cross stands erect, the Pauituima (Powis, *Ourax erythorynchus*\*) commences its low moan. On a previous occasion I had ascertained the truth of this assertion, when the Southern Cross was on the meridian at four o'clock in the morning; but as this is nearly the hour when that bird commences its booming (to use a word nearly approaching in sound to its moan), I laid at that time little stress on the circumstance. The banks of the Takutu are famed for the number of the savannah powis, and I had here a second opportunity of ascertaining that there is some truth in the Indian's assertion. On the 4th of April, 1842, when I was taking circum-meridian altitudes of  $\alpha$  Crucis, the bird commenced its solemn moan, which lasted about a quarter of an hour. The star was on the meridian that day at 25 min. past 11 P.M., by no means an usual hour for the powis to be heard; the coincidence, therefore, was the more remarkable. The draughtsman of the expedition, who noted the time of my altitudes, and to whom I had some days previously related the information I had received from the Indians, was equally astonished at the strange coincidence.

The Takutu had dwindled to a small rivulet near its mouth; its waters, of a light bluish cast, appeared in many places almost stagnant. The Mahu offered quite a different appearance. Although lower than it generally is, it pushed its mass of dark brown water far beyond the junction with the Takutu.

Our Indians amused themselves with wading to the opposite shore. We ourselves enjoyed the bath, though apprehensive on account of the ravenous Pirai (*Serrasalmo niger*†), and its numerous congeners, among which the *S. piranka* is perhaps the most dangerous. Our Indians proved that these fish were numerous by catching a great many with the hook and line. Another fish, which was equally plentiful at the mouth of the Takutu, was the *Pimelodus insignis*,‡ so remarkable for its second dorsal fin, which occupies in length nearly the whole space between the first dorsal and the tail.

The sky was generally clouded during our sojourn at the confluence of the Mahu and Takutu, and a fresh easterly breeze also contributed to lessen in a great measure the heat which we should

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upwards of one hundred circum-meridian altitudes of north and south stars. The longitude is the mean of the longitudes given by the two chronometers.

\* *Animals in Menageries*, by Mrs. Swainson. London, 1838; p. 187.

† *Naturalist's Library: Natural History of the Fishes of Guiana*, part i. p. 225, plate 18.

‡ *Ibid.*, 180, plate 6.

otherwise have felt—the more on account of an extensive sand-bank 2600 feet long, which in that dry season bordered on the site of our camp.\*

6th.—The instruments and other packages which could conveniently find place in the small boats having been embarked, we commenced the ascent of the Takutu. The first day I preferred walking in company with the Indians along the shore. Mr. Goodall, the artist, and Mr. Richard Schomburgk went in two of the small canoes. The corials ascended slowly, and we pedestrians soon outwalked them.

At the ford which the Brazilians of the Rio Branco generally make use of in crossing the Takutu, we waded to the left bank of the river, fringed with underbrush, bamboo (called rapau in the Macusi language), and a few trees of the same description as those I have already mentioned, the Sawarai palm (*Astrocaryon Iauari*, *Mart.*) occupied whole tracts among these thickets, and we had to guard ourselves against its large black prickles. We kept along the outskirts of these thickets, and found it by no means an easy matter to push our way forwards through grass of a man's height, and swamps which, although dry at the time, offered by their rank vegetation every obstacle to our progress. These spots are overgrown with numerous *Mauritia* palms, and our Indians profited by this opportunity to provide themselves with new sandals.

The *Mauritia* palm, or Ita of the colonist (*Mauritia flexuosa*), is one of the most useful among the interesting order which Linnaeus has so appropriately called “the princes of the vegetable kingdom.” There is scarcely any part of this majestic tree that is not made use of for domestic purposes; we need not wonder, therefore, that Father Cumilla, the illustrator of the Orinoco, calls this beautiful palm “Arbol de la Vida.” Its leaves, folded like a fan, furnish thatch; the fibres, thread to weave hammocks and make cordage; the trunk, a kind of sago, which the Warrau Indians make use of in time of scarcity; at certain seasons the Indians of the savannahs, and the Warrau of the Orinoco, draw from it a liquor of vinous taste, which when fermented is intoxi-

\* MEAN OF THERMOMETRICAL OBSERVATIONS AT THE MOUTH OF THE MAHU.

Period 1842.	Forenoon.		Noon.	Afternoon.		Remarks.
	6 hour.	9 hour.		3 hour.	4 hour.	
April 3rd to 5th }	<sup>0</sup> 72.50	<sup>0</sup> 80.12	<sup>0</sup> 89.12	<sup>0</sup> 89.43	<sup>0</sup> 82.50	Except some slight, drizzling showers, there was no rain.



cating. The fruit, which is tessellated, is of a dark brown on the outside, and when arrived at maturity, yellow within.

The Indians immerse this fruit in water until the yellow heart becomes soft, when it is considered fit to eat; and Europeans, though they dislike it at first, soon acquire a taste for it. The deer of the savannah, the peccary monkeys, aguris, parrots, all appear equally fond of this fruit; and the heavy tapir, on its way to its feeding-place, forms numerous paths through the rank vegetation of any swamp where there is an Ita palm with ripe fruit, which one unacquainted with the fact would imagine to have been made by human feet.

The savannahs between the Rupununi and Rio Branco are covered with numerous angular quartz rocks, and it would be painful to walk with unprotected feet over such places. The Indians, therefore, use sandals (*salza* in Macusi) made of the half-sheathing bases of the Ita-leaves, which are better suited for this purpose than those of any other palm. They are fastened in a fashion not much different from that of the ancients, and a pair of these sandals last at least a few days' journey over these rocky plains.

Even in its decay the Ita is of some use. When its trunk lies prostrate on the ground a large beetle (the *Calandra palmarum*) deposits its larvæ in it, which are considered a great delicacy not only by the Indians but likewise by many Europeans, especially by the French in Cayenne, Martinique, and Guadeloupe. The Indians frequently fell these palms, and, having cut several holes in the trunk, are sure to find numerous larvæ of the *Calandra* there in due time. I must not omit to mention that the Indians prepare a kind of salt from the ashes of the burnt leaves.

The Mauritis grow only in moist soil or swamps, and when we failed to procure water by digging at the foot of their trunks, we knew that our search would prove hopeless anywhere else in the neighbourhood.

We continued to follow the narrow fringe of wood which borders the Takutu. Sometimes the savannahs stretched to the river's edge, and formed steep banks, which now that the river appeared nearly at its lowest level, rose from 40 to 50 feet above the water. These natural sections, as a geologist would call them, show the structure of the adjacent savannah; white and ochreous clays, much mixed with rounded pebbles, formed the substratum, covered only a few inches with mould or fertile soil. Indeed I consider it hopeless to cultivate these savannahs, which may, however, prove useful as grazing grounds.\*

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\* The Macusi of Pirara have planted a piece of savannah soil, in the immediate vicinity of the village, with cotton and indigo, and when we arrived at Pirara the crop was over. During the dry season the shrubs had the appearance of dry sticks; but

I took a series of angles on one of these raised banks, which the Indians called Iperaghivi.

We started several deer which were grazing in groups of from four to ten. These regions being but seldom disturbed by the presence of man, they were more numerous than I have usually seen them. Our guns were put in request, a fine buck was soon brought down, and many others might have been obtained, if we had had means of transport.

The river as we ascend makes a considerable bend to the E., and is joined on the right bank by the small river Manari. Above the junction the Takutu comes from the S. and W.

We reached towards 4 o'clock in the afternoon the mouth of the small river Macupara, which falls into the Takutu on the left bank. It receives its name from a tree which, I have no doubt, is Aublet's *Macoucoua* (*Ilex macoucoua*, *Pers.*); the fruit is of the size of a small apple, and has a velvety appearance, from the quantity of soft short down with which it is covered.

The boats did not reach this place, where there had been formerly an Indian settlement, till after 6 o'clock in the evening. The Indians had set the savannahs on fire on the opposite bank of the river, and the large columns of red flames, which advanced against the wind, afforded after sunset a splendid spectacle.

7th.—On starting from Macupara I preferred taking a seat in one of the corials, as it appeared to me that in this way I could trace more accurately the course of the river. We had to pass a small rapid which is doubtless imperceptible when the river is high. Whenever the river turned towards the mountains a fine prospect opened to us; the higher elevations of the Canuku chain in sight were, Iquari, Zemai, Ilamikipang, with its precipitous rock; but far above all towered towards the E. the wall-like mountain Nappi (Batata mountain). This last-mentioned mass bore in the morning E. by S., our course being nearly south. At the end of this reach the river makes a sudden bend to the E., the savannah approaches on the left to the very verge of the river, and the western angle of the Canuku mountains becomes visible.

The river Capaya (Papaw\* River), fully as large as the Pirara, joins at the bend on the left bank; near its mouth is a peculiar formation of rock, which consists of cavernous shelves of sandstone mixed with clay, exhibiting on its horizontal planes a number of impressions that may have been left by some species of the order Isopoda. The upper structure, however, was the

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since the rain has set in, both plants have sprouted out most vigorously, and promise another crop. The indigo is used for colouring the cotton blue for hammocks.

\* *Carica papaya*.

most remarkable; it exhibited more or less clusters of cells, some square, some rounded, and from 6 to 8 inches in diameter.

About 2 miles further up the Takutu makes another bend to the E., and throughout its upper course comes more directly from the S., deviating merely a point or two to the W.

We halted in the evening near the mouth of the small river or creek Mucu-mucu, which has its source in the Guariwaka (mountain of the mist), one of the large mountains of the Canuku chain. I resolved to remain at this place for some days, as Mr. Fryer had been directed to join us here, if the state of Petry's wound permitted it.

While we were occupied erecting our tents and making the other necessary arrangements for encamping, we heard some of the Indian females cry out that a large snake was coiled up where they had intended to sling their hammocks; it proved to be a large rattle-snake, by no means a pleasant guest in the vicinity of a camp.

During my stay I took, as frequently as opportunity would permit it, astronomical observations, and ascertained, by trigonometrical measurement, the height of Ilamikipang. According to a rough calculation its height is 2500 feet above the savannahs, which is about the height of the Cradle Mountain in Brecknockshire.

Our party was successful in fishing and hunting; and as we had sent to the neighbouring settlements, we likewise procured an additional supply of Cassada-bread and ground provisions. Among the pirais which our fishermen brought in, were several of a uniform black; the iris of the eye was also black, surrounded with a golden ring. One of these fish measured 1 foot 5 inches in length and 8 inches in breadth; I considered it merely a variety of the common pirai. The Colite (*Platystoma tigrinum*),\* one of the most beautiful of its congeners, was very abundant. One weighed 16½ lbs., and was 2 feet 11 inches in length, the girth of the body amounting to 1 foot 8 inches.

I found here some of that beautiful and curious tree, which, through a misunderstanding, has been called 'Etaballia,' by Mr. Bentham.† When I first discovered this tree at the Esse-qui-bo, I was told by my coxswain, who was born on the river, that its name was Etaballia. But I afterwards discovered that I had been misinformed; and that the Etaballia of the Arawak Indians is the *Vochy Guianensis* of Aublet. The heart of the tree misnamed Etaballia is uncommonly hard, and would prove as ornamental as the Tiger-wood (*Machaerium Schomburgkii*; *Benth.*). It has nearly the same colour, and the intermediate woody mass is

\* Fishes of Guiana in Naturalist's Library, part i., p. 185, plate 8.

† *Vide* The Journal of Botany, by Sir W. J. Hooker. London, 1840, p. 99.

equally soft. The tree exudes, between the wood and bark, a thick red gummy substance, which, on paper, turns to a deep orange. This tree was in its full blossom, and the bright yellow of its flowers gave some variety to the banks of the river.

I consider April the commencement of the flowering season in the interior of Guiana, whether the rain has set in or not. It has been usually asserted that it requires first several days' severe rain before vegetation is awakened out of its lethargy. But although the wet month of March and part of April had elapsed without a drop of rain falling in Pirara,\* the banks of the Takutu were covered with trees and shrubs in blossom. The shrubs which, like our hawthorn, push forth, first their blossoms, and afterwards their leaves, were numerous. A splendid Tecoma, with its large yellow flowers, appeared sometimes as an arborescent shrub, sometimes as a tree; but although its blossoms almost covered the stems, there were only a few which had any leaves.

The splendid white flower tinged with rose of the Gustavia, the Cyan-blue of the Iacaranda, and the pure white of some Ingas, gave the whole scene an appearance which the tropics only can offer to the eyes of the traveller.

The palms were represented by the graceful Cucurit (Maximiliania regia), the Ita, and the Sawarai; the latter certainly not a pleasing sign to the agriculturist, who considers the soil sterile where it grows. The Malpighia verbascifolia, with its silvery leaves, spreads over his adjacent savannahs, and appears to exclude all other plants from the spots it occupies. Two arborescent shrubs of the same genus, one of them with yellow flowers, the other of the colour of our peach-blossom, composed the whole Flora, and did not contribute to remove the idea of the sterility of those arid plains, which have no further resemblance to the green meadows of the temperate zone, than that of being flat and covered with grass and sedges.

The mean of my observations gave for latitude  $3^{\circ} 21' 37''$  N., and the chronometers showed a difference of 20.58 miles W. of Pirara.†

\* The rainy season set in uncommonly late that year, and it was only in the first week in June that it began to rain heavily.

† MEAN OF THERMOMETRICAL OBSERVATIONS AT OUR CAMP NEAR ILAMIKIPANG.

Period 1842.	Forenoon.		Noon.	Afternoon.		Remarks.
	6 hour.	9 hour.		3 hour.	6 hour.	
April 8th to 10th }	74.57	79.67	86.17	91.17	84.83	It was generally clouded and a strong breeze from the N.N.E.

11th.—I had been given to understand that the next place we would come to on our ascent was a settlement of Wapisiana Indians, near the Cursato Mountains, which we might reach by water in four days, while it took only three days' march across the savannahs; I resolved therefore to send the greater part of the canoe-men and the Indian crew by land, and to follow the course of the Takutu upwards in the corials.

We proceeded on this day without having received any information from Pirara, for although through Mr. Fryer's absence the whole direction of the expedition devolved upon me, I did not wish to defer the further ascent of the Takutu, as that river continued to fall daily. Mr. Goodall, the artist, had meanwhile been instructed how to note the time during my astronomical observations, which he undertook willingly and performed satisfactorily; and the rest of the additional business for which I had engaged Mr. Fryer's assistance was accomplished by a little exertion on my part.

Soon after our departure from the camp we passed a great many blocks of a ferruginous conglomerate, which had almost a vitrified appearance, and might have been compared to slack coming out of a furnace. Such heaped-up blocks, sometimes covering a considerable extent of ground, are very common along the rivers Rupununi, Rewa, and Guidaru. We passed the small rivers Camu and Awarimani; the former has its source on Mount Ilamikipang.

The Takutu winds considerably where it approaches the Canuku Mountains. This chain, in which we recognise the mountain Cumucumu of the map of Pontes, the Cerro del Dorado, or Cerro Ucucuamo of the journal of Santos, and the Acucuamo of Caulin,\* divides the Rupununi from the Takutu. The former river has forced its way through the chain. The Takutu, however, on arriving opposite its western angle, is turned slightly to the S.E., and then westward; and having received its tributary the Mahu, makes a sharp angle, and turns S.W. towards the Rio Branco. A single glance at the map proves that the Mahu ought to be considered the recipient of the Takutu; its continued south-western course after it issues from the Pacaraima Mountains to its junction with the Branco, and its larger mass of water, entitles it, in geographical respects, to be considered the main trunk above the junction with the Takutu. The portion between the junction and the Rio Branco ought to bear the name

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The wind blew here with great force; towards sunset it generally lulled, but began to blow hurricane-like from the northern quarter towards 8 o'clock. I observed a black cloud rise about that time in the southern hemisphere, which, when it reached the altitude of about 25 degrees, expended, and the strong breeze set in.

\* *Vide* Humboldt's Personal Narrative, vol. vi. p. 517.

of the Mahu (Ireng of the Macusi) in lieu of the Takutu; however, custom has established an opinion diametrically opposite, and it would be useless now to change a name which has existed for centuries. Nicholas Hortsman, the first European who visited these regions, named the united streams 'Mahu,' and considered the Takutu a tributary of that river.\* The Curatawuiburi, a mountain of about 2000 feet in height, forms the western extremity of the Canuku chain. From this point the mountains stretch on their northern side N.E. (more accurately N. 43° E.), and on their southern side S.E. by E. towards the Rupununi; their loftiest summits, Nappi and Curassawaka, are situated on their northern side.

As it advances to the S.E., the southern range stretches from the right bank of the Rupununi eastward, in the direction of the natural pyramid of Ataripu, and the right bank of the river Guidaru, or Quitaro, a tributary of the Rewa. The greatest breadth of the range from Curatawuiburi to the banks of the Guidaru, is 60 miles. The mountains which stretch southward, are irregular groups of mountains, separated from each other by savannahs, of which I shall have occasion to speak hereafter.

On approaching Curatawuiburi, we found the Takutu so shallow, that we had repeatedly to unload the corials and push them by force over the sand. Large banks, consisting of heaped-up river sand, alternated with beds of rounded pebbles, as smooth and accurately rounded as if they had been wrought by instruments: they consisted chiefly of quartz pebbles, of a yellow and white colour; but amongst them I found some very fine agates, principally of that kind with interior zig-zag-parallel lines, which are known to mineralogists under the name of fortification agates, from the resemblance these lines bear to the plan of a modern fortification. Others were of a globular structure, and veined with jasper like the Egyptian pebbles. Below these beds of pebbles, and sometimes beside them, I noticed a black sand with minute quantities of gold of a light yellow; but whether the metal is present in sufficient quantities to render washing for it profitable, must be determined by closer examination than I could give it.

We were obliged to leave the corials to be lightened, and follow the bed of the river, wading through the shallows, or marching over the sand-banks. Between 2 and 3 o'clock in the afternoon the heat of the sun rose generally from 126° to 128° Fahr. This enormous heat, the glare of the white sand, which the rays of the sun heated to such a degree that it was painful to walk over it, but above all, legions of sand-flies, against the bite of

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\* *Vide* Humboldt's *Personal Narrative*, vol. v. p. 800.

which we could not protect ourselves, combined to render our progress fatiguing in the highest degree.

Although inured to the heat under the tropics, my face and hands were blistered, and the white sand and the dazzling mirage which hovered over the banks and the savannahs, caused inflammation of the eyes. My companions fared as ill, and we were glad when, with the setting sun, the freshness of the evening breeze cooled our burning faces, and drove the sand-flies (different species of *Simulia*) from us.

12th.—We reached the first rapids this morning: they were formed by a bar of clay slate which crossed the river in the direction of S.  $6\frac{1}{2}^{\circ}$  W.; the dip appeared N.  $60^{\circ}$  E., at an angle of about  $12^{\circ}$ . Several other rapids followed; and our progress was so much impeded, that if we had not fortunately laid in a good stock of provisions in Ilamikipang, our stores would have been exhausted ere we reached the settlement.

It became evident that it would be impossible to reach the Cursato mountains at the time we expected on leaving our camp at Ilamikipang: the river, however, was well stocked with fish, and frequented by numerous ducks and widgeons. The ducks, which we found in flocks of ten and fifteen, belonged to a species well known in our poultry yards—the musk duck, more generally known by the name of Muscovy duck, from an erroneous impression that it was introduced from Russia. This species appears to be spread over the greater part of South America, as we observe from the work of Azara, that it is also found in Paraguay. It feeds upon algæ and other fresh-water productions; but I never heard of its feeding, as Azara asserts, on the root of the manioc, or cassada, which is well known to be fatal to animal life; nor do I think that it feeds upon young Indian corn or maize; but I have frequently seen it nibbling at the vegetable productions along the margins of the river. The male birds are of a glossy black, with a few white spots on the smaller wing coverts, and some white feathers near the scapulars. The warty skin commences at the base of the bill and surrounds the orbits. The musk duck makes its nest on the banks of rivers in a hollow tree, frequently in the jungle which *Bamblousae* and rushes form near rivers and stagnant water. I have seen young ones in May and in September, and I am inclined to think it breeds in its wild state twice a year; I have counted from eight to ten young ones. The female watches over the ducklings with great care; and at the approach of any danger, the young ones disperse, and hide themselves among the jungle and bushes which border the river: as soon as the danger is over the anxious mother collects her brood by a peculiar note. During the breeding season bloody fights occur between the male birds: where these fights have

occurred the river is covered for some distance with feathers. The musk ducks roost at night in trees, to which they likewise resort when disturbed on the water: their flight is heavy, and accompanied by a loud noise caused by the wings. The young birds, when about a year old, are delicious and highly flavoured; the meat of the old ones is apt to be tough. The name musk duck (*Anas moschata*, L.) is said to have been given to this bird on account of a musky smell which it is said to possess, but which I have never been able to perceive.

The second species, the pretty vicissi (*Dendrocygna viduata*), are generally found in large flocks. When disturbed they fly up and encircle the feeding-place; making a whistling kind of noise, not unlike the sound "vicissi," from which the name is derived. Often, though I have seen them on the rivers and ponds, chiefly in the savannahs, I have never been able to discover one of their nests. They are easily tamed, and frequently reared by the Indians, who sell them to the colonists. I never heard of their breeding in the tame state, although the musk-duck, when reclaimed, is known to do so.

There are two other species which frequently feed with the vicissi, the *Dendrocygna lugubris* (*Swains.*) and the *D. Autumnalis*; but if they happen to be disturbed while feeding together, they separate in their flight. The Roppong of the Macusi (*Chauliadis pallida*, *Swains.*) haunts the ponds, and is seldom found on rivers.

The trees of the river were frequently ornamented with numerous blue macaws (*Macrocerus araranna*), which by their cries broke the silence that otherwise prevailed around us. As they make an excellent soup, we did not spare them. They are sometimes found in couples, and at other times in flocks of from ten to twenty. When the male or female of a couple was shot, the survivor would fly round the tree, with piteous cries, and looking in vain for its mate, then fly off to the opposite shore, and again return to the spot where it last saw it alive.

According to the observations I took this night the latitude of our camp was  $3^{\circ} 12' 53''$  N.\* The mean of the two chronometers gave  $26^{\circ} 6'$  miles (1m.  $58^{\circ} 38s.$  in time) W. of Pirara.

13th.—We met the first blocks of granite in the Takutu this morning. I noted here a remarkable geological feature—a large block of granite-gneiss was surrounded, as it were, by contorted masses of gneiss, which rose about 2 feet 6 inches above the water. The granite-gneiss is stratified apparently at an angle of  $45^{\circ}$ , pierced by veins of quartz, and large blocks of quartz lie upon it. Above this the river takes a sudden bend, and here large masses

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\* Stars observed, 1 and a. of Ursa Major; 1 and h. of Argus.



of granite, some 20 to 30 feet in height, are heaped up. Curata-wuiburi bears N. 73° E., which appears to be the direction of the strata.

We had now to pass a succession of falls and rapids; legions of sand-flies plagued us; and the thermometer showed at noon 108° Fahr.\* No breath of wind was stirring—anxiously as we wished that a strong breeze might set in, when the sand-flies vanish as if by magic. I had observed that the wind dies regularly away about nine o'clock in the morning, and only sets in again towards evening.

These cataracts are only caused by ridges or bars of rocks, which do not form real mountains, but traverse the savannahs in more or less an easterly direction. The cataract of the Rupununi (the "Corona") is formed in a similar manner in the flat savannahs; and it is worthy of remark that, where this river has forced a passage for nearly 60 miles through the Canuku mountains, it runs comparatively smooth, and only forms a cataract where it issues from the mountain pass, near the former mission Urua, or Curua.

We passed, soon after noon, the mouth of the small river Sawarau-uru † (Sauri, or Sarauru, in the maps hitherto published), by means of which and a portage the Rupununi is reached in 3 days. This was the portage traversed in 1739 by the surgeon Nicholas Hortsman, who left Demerara in search of gold and diamonds, which he expected to find in the interior of Guiana; and in 1793 by Francisco José Rodríguez Barata, lieutenant-colonel of the first regiment of the line at Para, who when ensign was sent twice with dispatches from the Amazon to Surinam.‡ It is still frequented by the Indians of the Takutu and the Brazilians of the Rio Branco. The river itself is about the size of the Pirara, and has its source in the Pinighette mountains.

The direction of the strata which form the numerous rapids we had to cross varied generally from S. 10° E. to S. 10° W. The rock appeared to be gneiss, sometimes encrusted with indurated clay, and with masses of decomposing quartz resting on it.

The kaiman, the crocodile of these rivers (alligator, *Sclerops*), is by no means uncommon in the Takutu. While our corials were advancing we saw a great commotion in the water about a hundred yards before us; we paddled more rapidly, and soon came up with a large kaiman, which had just secured one of its own kindred, the smaller kaikutshi. The kaiman had seized its

\* That is, not in shade, and the bulb freely exposed, but not directed towards the sun.

† Sawara is the name of the prickly palm which I have already mentioned (*Astrocaryon lauari*): au-uru means a river in the Wapisiana language.

‡ *Vide* Humboldt's Personal Narrative, vol. v., p. 480; vol. vi., p. 515.

prey by the middle of the body, so that the head and tail protruded on each side of its immense mouth. The kaikutshi still defended itself there, but without effect. On our nearer approach the kaiman dived; but, as it cannot devour its prey in the water, we saw it soon after climbing up the bank of the river.

14th.—The thermometer stood at 11 o'clock, freely exposed, 90° Fahr. The day was cloudy, and the wind E. by S. We passed a high bank of the river, perhaps 50 to 60 feet high, formed of a conglomerate of rounded quartz pebbles of different sizes; the cement consisting of ferruginous clay. Numerous blocks, loosened through the influence of the weather, were lying heaped up in great confusion on the side of the hilly bank. I could trace these rounded pebbles which formed the conglomerate, not agglutinated or cemented, for some distance in the savannahs, though there are no marks of the river having reached this height in our time. Our path was almost obstructed to-day by six otters (*Sutra enudris*? F. Cuv.), which appeared to contest our further progress. They raised themselves partly out of the water, and, making a peculiar snore, showed their formidable teeth. They cared so little for our presence, and came so near our canoes, that the Indians attempted to strike them with their paddles. I have little doubt but that in this instance they had their young ones in the neighbourhood; although generally far from shy, it is but seldom they show so much courage as on this occasion.\*

While the corials were passing some rapids I walked to an isolated hillock, which rose to the height of about 130 feet, at the distance of a mile from the river's right bank. The view which I enjoyed was lovely: the most prominent objects were the continuous chain of the Canuku mountains to the N.N.E.; to the E.S.E., the three-capped Saeraeri, that strange object in the landscape which forms the principal feature from whatever point it may be looked at, of a circle extending 30 to 40 miles in circumference, and a number of isolated hillocks, interrupted by savannahs, which extend from Saeraeri in a S.S.E. direction for 30 or 40 miles.

The highest summit of the Cursato mountains rose to a point to the E. of S.; and far to the S.W., the Mountain of the Moon (*Kai-irite* of the Wapisiana) bounded the horizon: a singular dome-shaped mountain towards the S.S.W., which I recognised as the Taquiara of my former expedition, but which the Wapisiana call Mariwette, appeared to be only 5 or 6 miles from my station. Four isolated hills extended from it in a south-western direction;

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\* There is some uncertainty among naturalists to which species the two kinds of otters belong, which frequent the large rivers of Guiana. The second species is much smaller than the one which attacked us in such a determined manner.

and, as the Takutu appeared to flow along these hills, promised us hard work for the following day.

We encamped on the left bank of the river, near an inlet which forms a large island when the water is high. Numerous shrubs of that species of *Eugenia* of which the Macusi Indians call the fruit "casam" bordered this inlet, the branches bending nearly to the ground under their loads of fruit. I observed several trees of *Outea acaciæfolia*;\* and a new species of *Genipa*. Some trees of the latter were so umbrageous that I erected my tent under one.

The inlet, or kirahagh, was stocked with that delicious fish the arowana,† and we saw whole shoals going in and out. This fish appears to abound in the Takutu; we frequently hemmed them in among the falls, and the Indians, armed with cutlasses and bludgeons, rushing among them, did excellent execution, to the advantage of our daily meals. Indeed, our success in fishing had been astonishing; besides the arowana, we secured numerous pirapoco, or morowai (*Xiphostoma occultatum*),‡ and patha (*Hydrocyan? Armatus*).§ The first is generally met with on sandy shallows, and in such places we had many a hunt to prevent them escaping by the single narrow channel through which water was flowing. The patha, or baiarra, frequents cataracts and rocky places, where the swiftness with which they swim, after being pierced by an arrow 5 to 6 feet long, has astonished us. Their strength is wonderful, and two of the front teeth are so long in the lower jaws as to protrude through the upper into sockets prepared for their reception.

A fish which we caught to-day among the falls proved of great interest to me: it belonged to the genus *Hypostoma*, and to that section which has the interoperculum very moveable, and furnished with tufts of rigid spines. The fins and the tail are margined with a bright orange spotted with black; the first dorsal fin is uncommonly large, and its integuments spotted with black. The strong contrast of its general colour—a dark brown, approaching to black, with the edging of bright orange—and the formidable aspect of this marked fish when it raised its dorsal fin, rendered it so interesting that I was quite delighted with my discovery; and I resolved, if it should prove new—as I have little doubt—to dedicate it to my kind friend Sir William Jardine,

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\* Described since in Mr. Bentham's enumerations of my Guiana plants—'Journal of Botany,' vol. ii. *et seq.*

† The Naturalist's History of the Fishes of Guiana, part i., p. 205, plate 12.

‡ Ibid., part i., p. 245, plate 23.

§ Ibid., p. 249, plate 25. This plate is not well executed: the second dorsal fin has been omitted, and the appearance of the fish has suffered in the reduction. The head is flatter than represented.

whose ichthyological researches and scientific acquirements are so well known among the friends of natural history.

Our camp was in lat.  $3^{\circ} 1' N.$ ,\* and 29.6 miles W. of Pirara.

15th.—Our progress was to-day interrupted by the fall Scabunk, the largest we have yet passed. It has received its name from the small river Scabunk, which joins the Takutu at the foot of the cataract from the E. This stream is called Catu-aury by the Wapisiana (which, as well as Scabunk-oute, signifies “sandy river”), from the heaps of sand which form its banks.

We had transported two of our corials over this obstacle, and made considerable progress with the third, so that we hoped to pass before noon, when an accident occurred which stopped our further progress for the present. The Takutu abounds in sting-rays (kaja), which partly bury themselves in the sand, and prove dangerous to those who wade through the river. Near Scabunk these fish were so numerous, that one of the Arecuna Indians was twice wounded above the instep: he appeared to suffer excruciatingly. While we were busy attempting to alleviate his pain, another Indian, a young Macusi, about thirteen years of age, was likewise wounded: not possessing so much power of enduring pain as the former, he gave way under it, threw himself upon the ground, with piercing cries, and began in his paroxysms to bite the sand, and bury his face in it. He was wounded in the sole of the foot, but he suffered the greatest pain in the groin, the region of the heart, and under the arms. In both instances I had a ligature applied above the wound, pressed it as much as possible, and had that of the younger Indian sucked. I applied poultices of cassada bread; and towards evening the pains were much alleviated.

It is but seldom that wounds by the formidable weapon nature has given to the sting-ray for its defence prove fatal. The serrated or jagged nature of this instrument causes a dangerous wound, but I doubt whether there is any injection of a deleterious liquid. It must be admitted, however, that the pains and symptoms resemble those of snake-poison; and so late as last year (1841) a valuable labourer on the plantation Zelandia, at Wakenaam, died in consequence of the wound which a sting-ray had inflicted upon him.

I observed at Scabunk, where the water had scooped out the banks, a white sandy grit, about 20 feet below the surface. The formation of the rocks is in every respect remarkable near this cataract, which, owing to the lowness of the water, was entirely exposed. The direction of the strata was S.  $20^{\circ}$  E. They were traversed by a different kind of rock, forming dikes about 2 feet

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\* Stars observed, Argus and  $\alpha$  Ursæ Majoris.

in thickness, of such a regular appearance that one might have supposed not nature but man had inlaid them. The direction of the dikes is N.  $60^{\circ}$  E. The strata are sometimes traversed by veins of quartz, which have a direction of E.  $15^{\circ}$  S.

16th.—Our patients were better. They were not able to walk, but as they could sit up in the corials, and as our stock of cassada bread was at the lowest ebb, we broke up our camp at an early hour.

We continued to toil against the rapids and cataracts. The river spread considerably, and huge blocks of granite lay about in great confusion. Some were dome-shaped, others cylindrical, but all were more or less rounded at the edges. The largest of them were from 40 to 50 feet in diameter.

We passed the fall Matzipao. While we were toiling here to get our corials across the only place where some water flowed over the rocks, we heard human voices, and soon after, to our joy, saw Sororeng and another Indian make their appearance. He had walked with the other Indians from Ilamikipang direct to the Cursato mountains, where they had arrived the third day after they left us. Alarmed at our non-appearance, he came to look for us. We learned from him that 3 hours' good walking over the savannahs would bring us to the Wapisiana village. Our joy at receiving this information was damped by learning that the provision-grounds of the village were so badly provided that the inhabitants satisfied themselves with eating a little Cassada-bread once a day, and lived mostly upon wild fruits and palm seeds.

I had before this time given up every idea of prosecuting our way in canoes. The fatigues we had undergone, and the little progress we had made during the last seven days, showed how impracticable it was to follow the Takutu at this advanced dry season. I therefore only wished to reach the landing-place of the village, distant from it about an hour's walk to the westward.

I noticed at the fall Dabaru an immense plateau of granite, with large flakes of quartz: veins of transparent quartz traversed it, with parallel dikes of a composition similar to that which I observed at Scabunk. We halted half a mile beyond Dabaru; and, sending Sororeng forward to the village, ordered him to bring our Indian crew, and as many of the inhabitants as he could procure next morning, in order to carry our baggage overland, it being my intention to abandon the corials.

19th.—The Indians having arrived, the corials were unloaded, and we proceeded towards an isolated hillock which the Wapisiana call Tenette. At its foot, on the south-eastern side, is the village. We had first to walk through a grove which extended partly up the hill, from which the most delicious odour was wafted towards us. I might have compared it to the fragrant smell of

hyacinths. We soon discovered the source: numerous trees of a large size, almost covered with white blossom, and dark-green leaves of a lucid appearance, scattered this delicious perfume. Its seed-vessels resembled Aublet's *Apalatoa*, and I would not hesitate to pronounce it to be *Tomhiroa aromatica* if there were not some anomalies in De Candolle's description. It may prove a new species of that interesting plant, as the inflorescence is terminal, and the leaves alternate.

We soon after entered the village, which consisted of six round houses. The captain and a great many of the inhabitants were absent. It appeared that scarcity had forced them to pay long visits to their neighbours, who were more fortunate in their provision-grounds. I found here messengers from Pirara, who had arrived this morning, and brought information that Petry, the wounded man, was by no means in such a state that Mr. Fryer could safely leave him.

A supply of rice forwarded by these messengers was a great acquisition; and, as I succeeded in purchasing three baskets of farina, I was enabled to execute my design of connecting trigonometrically the Canuku mountains with the Cursato, and the isolated groups through which we were told our path would lead us. The localities appeared to be well suited for such an operation. A short distance N.W. of the village, the hill Tenette rises 124 feet above the savannahs. It is partly clothed with wood of considerable size, but its top is almost bare, there being only a few curatella trees. Before the summit is reached, one has to cross two granitic platforms, upon which a few cacti (*Cereus* and *Melo cactus*) were growing. Near the platform among the fragments of rock are numerous myrtaceæ, and a species of *bursera* (*gummifera*?). The prospect is very lovely, and the Saeraeri mountains again form the chief object. I found here the tree in blossom which gives the wood known to the Brazilians under the name of *poa da rainka*. It is of a dark orange colour, approaching almost to red, and is used for many domestic purposes, and likewise for building small canoes. As it takes a fine polish, it would prove highly useful to the cabinet-makers. It is abundant round Pirara, but I had not before seen it in blossom. The most remarkable part is the large winged fruit-vessel, prickly near the base.\* The flower is papilionaceous, and of a pale orange colour.

Near the path which leads through the copse at the foot of Tenette is a remarkable silk-cotton tree, which astonished us by its immense size, and the extent of its ligneous buttresses or excrescences. Its height was only 102 feet, but its branches extended 129 feet; the circumference of the trunk, about one foot

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\* If I remember right, I have seen it pictured either by Jacquin or Aublet.

above the ground, was 57 feet; and the breadth of one of the tabular excrescences was  $8\frac{3}{4}$  feet. The Macusi call that kind of *Bombax* "copal-ye." It is the *Bombax globosa* of Aublet, of which *Bombax ellipticum* (H. B. and K.) appears to be only a marked variety.

I had selected a spot which appeared to be suited for measuring a base line, for the determination of the height of the Cursato mountains, and ascertaining the situation of the surrounding isolated groups of hills and mountains. From this point a larger base line was determined, which, resting its end on the hills Tenette and Manoa, extended in a north-western direction about 7500 yards.\*

The small mountain chain of Cursato, or, as some of the Indian tribes call it, Ursato, is of no great extent. Its whole length from N. to S. is scarcely 5 miles, and its highest summit (in  $2^{\circ} 47'$  N. lat.) does not extend 3000 feet above the river Takutu. These mountains are densely wooded, and the granite plateaux, or walls, which we observe in the Canuku chain, are almost entirely wanting. S.E. of Cursato is the mountain Duruau, and in front of it Manoa. The former is very rugged, and forms a sharp angle. Manoa has received its name from a supposed resemblance in its outlines to an ant-bear. It is necessary to be endowed with a very suggestive fancy to detect even the faintest likeness in that unshapen mass to the animal whose name it bears. A number of isolated groups, the largest of which are about  $1\frac{1}{2}$  to 2 miles in length, may be said to join the more extensive groups of Tuarutu and Kai-irite, either by intermediate groups or by ridges, while the latter send counter slopes towards the Pacaraima chain to the N.W., and towards the mountains of the Essequibo to the S.E.

The heat was excessive during the time I carried on these trigonometrical operations; and in consequence of the great extent of the sides of angles, and having no assistant, it proved very fatiguing. I was therefore always glad to meet one of those copses of wood on the savannahs which occur more frequently on the left bank of the Takutu than on the right. They afforded shade, and at that time one tree in particular was loaded with fruit, which, in consequence of its vinous taste, proved highly refreshing. It was the *Melicocca bijuga*, a tree of considerable size, which the Macusi Indians call macu.† This tree is cultivated in

\* It must be understood that the angles were merely ascertained by the sextant; but as they were repeated on different days and at different hours, and only the mean of these observations used for the calculation, the error of an instrument so incomplete for such operations may be assumed to be neutralised.

† There are from one to two seeds in each berry: "*Bacca una sperma*," in the systematical description, must therefore be modified. I have seen as many as three seeds in one berry. The sides of the seeds, which touch each other, are flat.

the West India Islands, but is seldom met with in Demerara. Indeed I know only of one specimen in George Town. Among other fruits which were then in season was the *Duroia eriopila* (*Genipa merianæ*, Rich.) and *Genipa edulis*. The first is known in the colony under the name of the marmalade box, and is delicious. The Macusi Indians call it "umpa." The fruit of the *Genipa edulis* (Rich.) resembles a mellow quince, but cannot vie with the former, although they belong to the same genus.

In our peregrinations in the savannahs we frequently met with the nests of wild bees. They belonged to a species which the Macusi Indians call Wampang; the Wapisiana *camuiba*. The hives or nests are generally fixed to branches of trees, and are from 2 to 3 feet in length. The materials with which these bees build are bits of wood mixed with glue, which they tread with their feet until it becomes of the consistence of paper, and of a firm texture. Their cells are hexagonal, and contain only what is vulgarly called worms and honey. The latter is uncommonly sweet; but it is remarkable that in none of their nests, and I have seen many opened, is any vestige of wax to be found. The bee is small, being not more than from four to five tenths of an inch in length; the body is dark brown and hairy, which gives it a velvet-like appearance; the wings of the abdomen are black, margined with a rust-coloured, almost yellowish, band; the superior wings transparent, at their outer edges brown, and marked with eight or nine cells. It stings severely; and in order to secure nests the Indians kindle fires under them, when the insects abandon their fabrics *en masse*. I have, however, seen an Indian who was the conjuror or *piaman* of his tribe, merely approach the nest, and knocking with his fingers against it, drive out all the bees without a single one injuring him. I noticed him drawing his fingers under the pits of his arms before he knocked against the hive.

A second species of honey-bee is destitute of a sting, and produces both honey and wax. The honey is slightly acidulous, and is deposited in hollow trees. The Macusi call this kind "mapa."

I was five days occupied from morning to night before I finished my operations in the savannahs, much to the astonishment of the Wapisiana Indians, who at the commencement could not conceive for what purpose I underwent so much fatigue. An Indian rather advanced in age, who appeared to have travelled a good deal in the neighbourhood, made me acquainted with the names of the numerous groups of mountains which I could see from my principal stations, and proved so serviceable that I gladly engaged him to accompany me to the sources of the Takutu.

The Wapisiana are taller than the Macusi Indians, and their heads are small in proportion to the body, and their necks short.



The molar or cheek bones are more prominent than with the Macusi, and their noses straighter. Their language differs materially from that of the Macusi, but it resembles that of the Pauxana, who border on their territory to the S.W. They are less industrious than the Macusi, and negligent in their houses, which are generally filthy.

These houses are built in the form of domes or cupolas, and covered with leaves of palms, chiefly with those of the *Mauritia* or *Ita*, of which there are many on the savannahs. The circular hut is about 25 to 30 feet in diameter, and is inhabited by several families. The entrance is the only aperture in this fabric, and this is shut at night by a door made of palm-leaves. There are no partitions to divide the properties of different families: a few stones, forming a hearth, are the only token of a family's right to any particular spot. Three beams, fastened to uprights by means of bushropes or lianas, traverse the hut at the height of five or six feet, and serve to sling their hammocks upon, or to deposit their bows and arrows, and that singular instrument the "blowpipe."

As every family considers it the peculiar right or duty of the other to clean their common habitation, I need not observe that none do it, and filth accumulates to a disgusting degree. The smoke from four or five fires, not being able to find an outlet but through the narrow crevices which may have been left in the thatch, circles in mazy columns through the hut, and brings tears in the eyes of those who are uninitiated to Indian life. Fowls, which are found in almost every Indian settlement, parrots innumerable, and other domestic animals, contend for the partial possession of the hut; but the large number of half-starved dogs, always ready to make acquaintance with the stranger's calves, constituted the greatest nuisance. Numbers of fleas, and that insidious insect the chigo, complete the comforts which await the stranger's arrival at such a hive. I made it therefore a rule, where no hut could be given up for our sole occupation, to prefer sleeping under the tent-cloth, or rather in the open air.

The Wapisiana wear their hair short. I have never seen a Wapisiana with his hair hanging down to his shoulders, as is often the case with the Macusi. Those who can maintain several women, practise polygamy: it is not so frequent, however, as among the Warrau and Accawai. In their domestic manners they do not differ from the Macusi, or Indians of Guiana in general.

The survey detained me till the 23rd of April at Tenette, when scarcity of provisions forced us to continue our journey. The weather had been fair, but the mornings were generally so much clouded that observations became precarious. The mean of several meridian altitudes of N. and S. stars gave me as latitude

2° 49' 40" N.;\* and the difference of longitude between Pirara amounted to 29·13 miles W. I am the more confident of the correctness of this difference of longitude, that, by measurement of the difference between Tenette and Pirara, I obtained 29·23 miles as the result. The mean would be 29·18 miles, or 1m. 56·76s. mean time.

During our stay we had an example how easily the Takutu swells merely from a thunder-storm. The rain, it is true, fell in torrents during the night from the 18th to the 19th of April, but I was nevertheless astonished to find in the morning the rocks of the neighbouring cataract Cocoya covered, and the water rushing over it with great force. Two days previously I waded to the opposite shore, the water scarcely reaching above the ankles.

I vibrated here, for the first time since we left Pirara, the magnetic needles L (a) and (b), and found that the magnetic force exhibited itself, by 100 oscillations in 2m. 51·25s., at 87° F. per needle L (a), and the same number in 3m. 56·21s. at 86° F. per needle L (b). The first result is the mean of two sets, each of 360 vibrations; the second only of one set, as a thunder-storm interrupted the experiment.†

23rd.—We were obliged to have our baggage carried upon the backs of the Indians, as we could not make any progress by water. I had therefore to increase our number considerably, in which I readily succeeded.

We left early, and reached, after an hour's walk over the savannahs, the small river Cursorari, where it enters the Takutu. We found here a canoe, by means of which we crossed to the left bank of the Takutu. Numerous trees of the *Elizabetha coccinea*,‡ with its bright scarlet flowers, skirted the river; and I found here, for the first time, ripe seeds of this interesting tree, which I hope may germinate in our green-houses in Europe. The tree bore

\* I possess 45 circum-meridian altitudes of N. and S. stars, which want of time has not yet permitted me to calculate.

† MEAN OF THERMOMETRICAL OBSERVATIONS AT TENETTE.

Period. 1842.	Forenoon.		Noon.	Afternoon.		Remarks.
	6 hour.	9 hour.		3 hour.	6 hour.	
April 13th } to 23rd }	75·87	79·83	87·63	90·10	81·33	These observations were made in a hut, and the thermometer guarded against any reflection of the sun's rays. It was clouded during this period.

‡ So named in honour of her Majesty the Queen of Prussia. *Vide* 'Journal of Botany,' by Sir W. Hooker, vol. ii. p. 92.

buds, flowers, and seeds. The pods, of a scarlet velvety appearance, add to the beauty of the tree.

Our course was directed towards the singular-peaked mountain Au-uru-paru. Interested by some plants, I loitered behind the marching column, when an approaching thunder-storm warned me to make haste to come up with the Indian who carried my cloak. Unfortunately I missed the way, and did not overtake my companions till I was perfectly drenched with the rain. In order to avoid some swampy ground, the guides had led across a pathless tract. It was one of those tropical torrents when the quantity of rain amounts to a couple of inches in the course of two hours; and although we had reached a copse of palms and wild plantains\* (parime of the Macusi) near the brook Totowau, it could afford us only a trifling protection. When we issued from this copse I was much pleased with the aspect of a number of hillocks, which, clothed with a vivid green, and encircled by woods, contrasted strongly with the general appearance of the savannahs. The woody tracts appeared to become more prevalent towards the W., where we traced a large fringe of thick forest, no doubt extending for a considerable distance in that direction. We soon after entered a wood, exhibiting the exuberance of tropical vegetation. Numerous palms; the broad leaf of the wild plantain, so gigantic among the Endogens that our European vegetation has nothing similar to offer; passion-flowers, with bright scarlet petals and bluish rays; psychotricaceæ with orange, and cephalideæ with rose-coloured and blue bracts, stamped the forest with a tropical aspect.

The vegetable mould upon the ochreous clay appeared to possess great fertility; I was therefore not astonished to find in the middle of the wood a spot which the Indians had cleared and planted with provisions. Sororeng pointed out to me cuttings of a plant (very probably a Euphorbiacea) which had been planted among the Cassada, and which he told me were used to intoxicate fish with. It may be a *Phyllanthus*, but, as only cuttings without leaves were to be seen, I cannot decide whether it was so or not.

A small hut, scarcely affording room for two or three men, rose on the side of the spot, where the circular mark of black ashes showed that there was formerly a house of some extent, according to the comparative ideas of those children of the wilderness. It was temporarily occupied by a Macusi family from the Rio Branco, among whom, to my great astonishment and joy, I recognised two Indians who accompanied me on my journey across the mountains to the Orinoco, one of whom we had been under the necessity of leaving behind in a village on the banks of the

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\* *Phenakasperum Guianensis* (Endliater).

Kundanama, on account of his being in too weak a state from low fever to proceed.\* On his recovery he traced his way back to his village, although it was between 400 and 500 miles, and now looked hearty and well.

After I had given my old friends and their families some presents, we continued our journey towards the naked hill Kuipaiti, having understood we should find a settlement there. It consisted of a single hut built near the foot of the hill Au-uru-paru. The inhabitants were mostly old: I observed an old woman with snow-white hair, the second whom I have seen among the Indians with that indication of great age: her skin in wrinkles, and her body attenuated almost to a skeleton, afforded an appalling picture. Curiosity induced her, in spite of her weakness, to leave her hammock to view the first Paranaghiri, as they call the light-haired Europeans, who ever visited their abode. Old age among the Indians appears in more frightful forms than with the Europeans of the temperate zone; and as if to make, in this instance, its aspect the more repulsive, she was led out of the hut by an idiot boy, who with a vacant look, his mouth open, and his tongue protruding, stared alternately at us and at her.

Idiocy is considered sacred among the Indians; they look upon those who are affected by it as marked beings, and their doings and sayings are considered oracular. In the present case the spirit did not move him, and oppressed—I will not say disgusted—by the sight, I turned away.

A young female, indeed the only one, who by appearance and age contrasted strongly with those around her, brought me some mapa, or wild honey, which she had collected in a bottle-gourd, and which she tendered with a smile. A few strings of mock coral beads which she received in return as a present, seemed to make her happy.

Our expectation of procuring a large supply of Cassada-bread was disappointed; only a few cakes were promised us; but to make amends we were told that large numbers of deer were in the neighbourhood: I resolved therefore to halt next day, and dispatched our best huntsman in search of game. The naked hill Kuipaiti, one of the points determined from Tenette, promised to afford me an opportunity of verifying and extending the angles of my survey.

24th.—The Wapisiana Indians call all hills which consist of solid rock, and are only sparingly covered with vegetation, by the general name of Kuipaiti. The hill to which we directed our course this morning does not strictly belong to this class. The base consists of granite, or granite gneiss, forming (about 250 feet

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\* *Vide* Journal of the Royal Geographical Society, vol. x.

above the savannah) an immense wall from 50 to 60 feet high, extending S.W. for several hundred yards. Near the summit the substance of the rock changes.

The seams of the stratification, where they are exposed in consequence of the rains having washed off the soil, run E.N.E., and are apparently traversed by others in a N.E. direction, which divide the rock in the form of lozenges. As the rock has a basaltic appearance, I have little doubt that it has pierced the granite. Large veins of quartz traverse this rock. At the foot of the hill lie numerous *débris*, chiefly near a ravine which, although dry at this period, may be a mountain torrent during the rainy season, when every hill sends its contribution of water to the plain below.

On our way to Kuipaiti we observed many hundreds of a beautiful white lily, which looked like stars reflected in a sea of verdure. They are generally found in moist savannahs; and their stem, upwards of 30 inches long, bears from one to three lilies (generally two),  $10\frac{1}{2}$  inches long, and 6 inches wide. They have a faint smell during the morning and evening. The Macusi call them *manasero*; the Wapisiana, *guatappu*. This plant is a *hippeastrum*, belonging to the order *Amaryllidaceæ*.

Our prospect from this hill was more extensive than from Tenette or Manoa; and as we were favoured with an almost clear sky, my desire to procure angles for the survey was fully gratified. I think the summit of Kuipaiti is about 500 feet; and our view extended southward to the far distant Tuarutu, and in the same direction was bounded by the mountains of the moon—the Kai-irite of the Wapisiana. Towards the north we observed the Canuku, having the appearance of a bluish line, interrupted here and there by towering clouds, which rested upon the ridge of the mountains. At our feet was the savannah, through which the Takutu meandered in numerous windings, fringed by a line of bush and high trees. Thick forests extended from Mount Mariwette, along Kuipaiti, towards the Takutu and Fort São Joaquim. The Watuwau, a tributary stream of some size, joined the Takutu towards the S.W.

I received here a proof how fallacious it is to trust implicitly to Indian information, especially when double interpretation is required to come to an understanding. When I visited the Caruma Mountains in August, 1838, an Indian, who I was told had travelled much, accompanied us to the summit, and by him I was given to understand that the Indians of the Rio Branco reached the Takutu by the route of the river Guidiwau. I further understood him, or at least so it was interpreted to me, that the Guidiwau approached the Caruma within a few miles (indeed he pointed out the water-course to me), and afterwards made a circular sweep to its junction with the Takutu, which he said was about a day's

journey from the Ursato or Cursato mountains. I mentioned this in my Report to the Royal Geographical Society, and inserted the course in my map, in dotted lines, according to his statement.\* To my great astonishment I now received undeniable proof that the Guidiwau is no tributary of the Takutu, but falls into the Rio Branco. It approaches, indeed, the small river Curati, which falls into the Takutu, a little south of Au-uruparu, so near that the two streams are connected by a much frequented portage. The name of the river Watuwau, which falls into the Takutu, and the portage between Guidiwau and the Takutu, or rather one of its tributaries, has no doubt given rise to the mistake. A traveller cannot guard himself sufficiently against false information. The wish of the Indians to be considered well acquainted with their country, or much travelled, as they express it, and occasionally misapprehension of statements made in a language which leaves much to be conjectured from the arrangement of words, or the emphasis with which they are pronounced, give rise to great mistakes in geography and natural history, especially when the traveller is under the necessity of using double interpreters.

On returning to our camp we found that our huntsmen had been very successful: seven fine deer had been shot in less than three hours. Being thus sure of provisions for several days, I resolved to continue our journey next morning, as we had to march 4 days before meeting another habitation.

The deer of the savannahs, the "beyu" of the colonists, is allied to (perhaps only a variety of) the *Cervus Mexicanus* of Pennant. They are found upon the savannahs in couples, and frequently in small herds of five or six. The female brings forth her young in March or April. I know not whether this species is peculiar to the savannahs of the Rupununi, or whether it is the same that grazes upon the savannahs near the coast; this, however, is certain, that it does not inhabit woods. Its wide-branching antlers disqualify it for such an abode.

25th.—We started at  $\frac{1}{2}$ -past 6; our guides led us at first over pathless savannahs, and afterwards directed their course towards Mount Wurucokua. We crossed the stream Curati, which, as I have already observed, offers a portage to the Guidiwau and Rio Branco. A tree which had been felled in such a way that its base remained on the left bank, while its branches rested on the opposite side, served as a bridge, but those who feared giddiness, and did not wish an involuntary bath, preferred wading. We next passed the low hills Wariwe, near a ruined settlement, the site of which had been judiciously chosen. They extend for about

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\* *Vide* Journal of the Royal Geographical Society, vol. x.

1½ mile N.N.E. and S.S.W.; they are well wooded, and abound in rich vegetable mould for provision grounds. The eminence upon which the settlement alluded to had been erected, afforded an extensive view.

A number of detached hills, of which Wurucokua is the highest, extend in an E.S.E. direction for several miles. They are but sparingly wooded, and covered with fragments of rock: their sides, furrowed by tropical torrents, exhibit a dark red clay, quite in keeping with the yellow appearance of the few grasses and sedges which are the only representatives of vegetation on their surface. The small brook Urucokua has its source among these hills, and falls into the Watuwau. A wall, consisting of fragments of rocks, extends for nearly a mile S. 60° E. from Wurucokua, over the savannahs: it reminded me of the granitic wall of the Caquire, near Esmeralda; but where was the majestic Duida—that landmark which guides the voyager on the Orinoco for hundreds of miles—with its cloud-topped summit and colossal walls of sandstone? Wurucokua could vie with it neither in height\* nor historical interest; no Humboldt had botanised or executed geodetical measurements in its vicinity; no Spanish legend told of treasures of diamonds or emeralds buried in its bowels!

A walk of ½ an hour further brought us to a formation of indurated red clay, mixed with angular quartz pebbles, upon which blocks of decomposing granite were lying in great confusion.

The hill Piritate forms the most southern knot of the irregular groups of Wurucokua, Wayawatidu, and Wakuroite. We kept along the eastern side of these mountain groups, which stretched southwards towards Tuarutu and Ossotshuni; and south-westward towards Kai-irite. Similar groups (among which Pauisette, Rhati, Duruau, Pinighette, &c., were the most considerable) stretched from N. to S. along the right side of the Takutu, a distance of from 5 to 10 miles from its banks.

About noon we entered low savannahs; small copses of shrubs, perhaps not more than 50 steps in circumference, studded them here and there. The soil was very moist, and these green spots, where everything else looked yellow from the continued drought, had an appearance peculiarly refreshing. I was not a little astonished to discover among several *Epidendreæ*, the curious *Epistephium parviflorum* (*Lindley*), which, six years ago, I discovered upon the savannahs of the Tapacoma lake, a distance of upwards of 300 miles from its present habitat. In the vicinity of the plant I likewise saw the pretty *Bachia* (*Miki*, or *Cleistes rosea*, *Lindley*), which is found in the same situation in the

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\* The Duida rises 7147 feet above the savannahs; I estimated Wurucokua 1500 feet above the savannahs.

savannahs of the Tapacoma and Capooy. But much as I was pleased with these remembrancers of former days, and of a delightful ride in company with one of the most scientific planters of Demerara, my joy was surpassed by the discovery of a new Orchidea, among the moist places of the little copses. After exploring British Guiana from N. to S., and from E. to W., a new *species* added to the number of known Orchideæ would have been a source of gratification; how much more then the discovering a new genus, distinguished by habit, beauty, and fragrance!\*

We reached about noon the river Watuwau,† a foaming torrent about 150 yards wide. Although its bed was scarcely filled with water, and reached above the waist only in one or two places, we found great difficulty in fording it on account of the strength of the current and the numerous loose rocks which filled the bed of the river.

After halting for an hour, we resumed our march, and passed savannahs covered with fragments of angular quartz rocks. The highest peaks of Kai-irite bore S. 54° W. The bright rock, upon which the sun reflected its rays, shone with a dazzling whiteness; the outline of this hill resembling a crescent in the distance, the Wapisiana have compared it to the moon (Kaira in their language), and call it in consequence Kai-irite, or mountains of the moon. The rock appears to be white quartz, and like others of a similar description in the Canuku chain, the Duida, &c., being colder than the atmosphere, is constantly moist, in consequence of the condensation of vapours produced by the rank vegetation. As soon, therefore, as the sun reaches a certain height, and throws his rays under a certain angle upon the moist rock, it shines with a dazzling white, and may be seen at the distance of fifty or sixty miles. Such rocks shine periodically, according as the sun has N. or S. declination. A similar rock lies on the side of one of the mountains of Pacaraima, bearing N. 29° W. from Pirara; it shines only from May to August; earlier or later than that season the rays of the sun do not fall upon the rock at such angles as to reflect its moist surface. These rocks may be called natural helioscopes, and have served me in my geodetical operations in lieu of that instrument to determine their exact situation, and the mountains upon which they lie.

Rocks of this kind occur among the Canuku mountains at Mount Curassawaka and Guariwaka. Humboldt mentions others at the Duida, and some mountains of the Orinoco, which the

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\* Drawings and dried specimens, with a more detailed description, have been sent to Dr. Lindley, to whose excellent monograph, botanists and the amateurs of this interesting family of plants, must be ever grateful; and I have no doubt that if the genus alluded to in the text is really new, a more detailed account will be published by him.

† It has received its name from the common vulture (*Cathartes aurea*).



Indians have called the sun and moon. The shining rock of Kai-irite, however, is the largest of this description I have seen in my travels. At the distance of about twenty-five miles it makes an angle of  $18'$ , from which I suppose it cannot be less than 700 feet high. The mountain chain, of which Kai-irite is the highest, is called at present by the Brazilians *Serra da Luna*. It is perhaps the *Serra Yauina* of older maps; at least it corresponds with the situation given in Arrowsmith's map to that *serra*. I have learned with surprise that, although not far distant from the Rio Branco, it is a perfect *terra incognita* both among the Brazilians and the Indians. In all my excursions I have not met with one individual who had visited it; and the Indian banishes all evil spirits to this region, while the Brazilian considers it the abode of wild Indians, who massacre any person foolhardy enough to come within their precincts.

The chain extends from N. towards S.E. It is not directly connected with the mountains of the upper Essequibo; isolated groups and savannahs, where forests alternate with grass-covered flats, interrupt the chain. However, Kai-irite has the highest pinnacles of any chain in the neighbourhood; the angle of that mountain, at the distance of 23 miles, amounts to  $1^{\circ} 16' 55'$ , and, as I was on rising ground when I took it, the height of this summit cannot be less than 3100 feet.

This measurement was made near Aruatintiku (tiger hill), a hill about eight or nine hundred feet high; it is well wooded, and has a singular peak, being no doubt a needle of granite. It gives the hill such a remarkable appearance, that it is easily recognised at a great distance, and was therefore of great service in my survey. Although named from the number of jaguars or tigers which are said to prowl about it, we selected a narrow woody valley which it formed with the next hill for our night's quarters. In the neighbourhood of Aruatintiku is a remarkable rock poised on the top of another; it resembles the celebrated rocking stone in Cornwall. Another singular rock, columnar in its shape, lies on the side of the hill next to Aruatintiku.

We found out a few small pools of bluish thick water in the vicinity of our camp, and necessity forced us to quench our thirst with it, bad as it looked. The Indians found numerous trees of the *melicoea*, the fruit of which assisted in quenching our thirst. At night a violent wind blew from the S.W., and the trees on the hill bent under its force. It lulled about midnight, but once awoke I found it difficult to sleep again. I was amused with the regular notes of a night-hawk, which went through the scale of a musical octave, omitting only one note in the gamut.

26th.—We broke up our camp at an earlier hour than usual, anxious to fall in with flowing water. We passed the isolated

mountain groups Tabaitighu, which form almost a half circle, and appear to be connected with the western part of Aruatintiku. Mount Wayawa-tidu, which we passed yesterday, rose above them.

The little chain Muruwit rises perfectly isolated out of the savannahs; it consists of several eminences, which in the distance have the appearance of towers. The most western is a solid mass of granite, from 400 to 500 feet high; and, like all those hills of naked solid stone, is called kuipaiti—"the rock *par excellence*." The wish to procure some angles for my survey induced me to mount it; and there was also, I must confess, something like a foreboding that I should make a new botanical discovery, which urged me not to mind the steep and perilous ascent. I had mounted about 200 feet, when I found myself separated from the summit by a deep hollow. The place where I stood still exhibited the features of the savannah, some spots of grass, and a few stunted *Curatellas*. The almost naked mass before me was only covered here and there with a species of *Chisia*, some *Epidendrææ*, and a *Monochanthus*. From the ravine or hollow rose some large trees, and by dint of climbing and descending I reached the bottom. A small rill of water meandered through it, forming a succession of cascades. It was a romantic spot; but what enhanced it was the fine odour of numerous wild pine-apples which grew in clusters along the margin of the stream. However the spiny leaves rather opposed our progress, while the delicious odour, and the citron yellow of the fruit, stimulated the organ of taste. The wild pine is small, and of a brighter yellow than the cultivated fruit. Its taste, when perfectly ripe, is highly aromatic; the only drawback is the great number of seeds which it contains, and which are so seldom met with in the cultivated pine. When we reached the granitic platform, a fine prospect opened towards Kai-irite and Tuarutu; and the bluish outlines of the Canuku indicated the direction of the path we had so far successfully accomplished. A *Eugenia*, some Cacti, and Melo-cacti, *Cyrtopodium Andersonii*, which so appropriately has been styled the sugar-cane (or Chidea) by the Indians, from the resemblance of its leaves and general habit to the root stocks of the sugar-cane, diversified the otherwise not multiform Flora of Kuipaiti. I found on the summit a *Gesneria*, not in flower, and was already on the point of returning, having procured the desired angles, rather disappointed with my botanical discoveries, when some bright scarlet flowers attracted my attention. The side view which I had merely of the first flowers, and the yellow disk on the petals, made me almost believe I saw an *Abutilon* before me; but a nearer examination persuaded me that it was the most splendid of the family of *Helicterææ*. Its large

flowers, their bright scarlet and yellow disks, as well as their peculiar form, will render it a great acquisition to our collection of hot-house plants. It is a shrub from 12 to 15 feet high; the branches straggling, of a greyish colour; the leaves are cordate and serrated; above of a dark green, but in consequence of the soft hairs, playing according as the light falls upon them, they have a velvety appearance; the lower part is downy; the calyx almost yellowish green; the petals of a bright scarlet, irregularly formed, and the upper two marked with a yellow disk. The shrub was thickly covered with flowers; it appears that they do not last long, for which, however, a succession of buds makes compensation. It is known to botanists that the fruit is spirally twisted, from which circumstance it has been compared to a screw. At the foot of the hill I observed numerous specimens of *Epidendrum pachyanthum* (Lindley) with large green flowers, which I had seen on the banks of the lower Essequibo and at Roraima. Indeed the copses of underbrush in the savannahs among which it grew, remind me much of the savannahs of that remarkable region, "the sandstone mountains of Roraima;" however, their pride, the *Sobralia Elizabethæ* (Mih.) was not to be seen among the copses near Kuipaiti.

A large column of smoke pointed out the direction where the rest were halting; some had set the savannahs on fire, and, fanned by a smart easterly wind, the flame advanced with great swiftness, until it seized the fringe of wood, which bordered a small rivulet, which we afterwards crossed. The naked trees with their blackened trunks, the ground covered with whitish ashes, and a number of carrion crows and hawks, which, disturbed by the heat of the flames, flew in circles around their former roosting-places, increased the desolate appearance which a savannah offers during the height of the dry season.

The barking of several dogs told us that Indians were near. We soon after reached an eminence consisting of solid granite, and discovered an old Indian, who, with a certain nonchalance in his features, calmly waited our arrival; he was sitting on a large rock, and having thrown a glance on our number, turned his face. When re-assured by our manner, he hallooed into the wood, and soon after his daughter made her appearance with a fine boy of about 7 years of age; her husband followed in a little time; they had only arrived that afternoon from the settlement of Tuarutu, for the purpose of hunting deer, of which there are none in the mountains. It had taken them nearly three days to reach the spot where we found them.

This granitic hill was covered with numerous *Agava* (*A. vivipara*), some in blossom, surrounded by a large number of young ones, which, having fallen on the ground from the mother stem,

had taken root. The *Agava vivipara* is by no means so handsome as the common *Agava* (*Aloe Americana*): the bright orange of the latter, and its number of flowers, surpass in beauty the greenish blossom and the straggling shape of the viviparous *Agava*.

Torrents of rain, accompanied by thunder, kept us awake during the latter part of the night. Although we were partly protected by huge trees, our tent curtains were not strong enough to withstand such a severe fall of rain.

27th.—The Indians whom we had met the day previous left their sleeping-place long before daylight, in order to arrive at their settlement before us—partly, I presume, from a desire to communicate the news of the arrival of Paranaghiris, and partly to remove the fear which our appearance would otherwise have caused.

The severe rain of last night had set the savannahs under water, and we had to wade for several hours. I observed near our path an *Oncidium* with yellow flowers, which appeared new to me—at least I gathered it for the first time in Guiana. The prevalence of yellow amongst this genus is remarkable; and it will be observed that the leaves of the yellow-flowered species correspond in form, while the rose-coloured *Lanceanum*, and the spotted *O. papilio*, differ in their form of leaves from all the others. Indeed, these two species and their kindred stand singularly alone among the *Orchideæ*.

On approaching the Tuarutu mountains we entered a wood; and, passing a defile, found ourselves among hills of about 400 feet high, where savannahs appeared to struggle with forests which of the two was to prevail in the landscape. These hills were encircled by others of much greater height. Scarcely any traces of a path were visible; and I gave the necessary orders that our people from the coast should keep close together, to prevent their losing the way. We thus passed from wood to savannah, and *vice versâ*, now mounting hillocks, or winding our path among large blocks of granite. The scenery bore the stamp of great wildness. On the left we observed a remarkable rock rising solitary to a great height, much in the form of the natural pyramid of Ataraipu. Its summit was covered with vegetation, and here and there a shrub found a place in some of the clefts which the granite formed. This strange object bore N. 85° E. from our path, and was about 2½ miles distant. The Wapisiana called it Aikuwé, but I could not learn whether any traditions were connected with it.

We had again to climb a hill covered with enormous blocks of granite, between which we had to force our path. Some of these rocks were covered with *Cyrtopodium Andersonii*, Schom-

burgkia Marginata, Vanilla, Brassevola, and a number of the beautiful *Catleya superba* (Mih.), of which I had not seen any specimens since I left the Rupununi. This force of vegetation upon a naked rock, which from its peculiar form alone would attract attention, is surprising to the stranger, accustomed to the slow progress of northern vegetation, where the blocks of granite seldom afford nutriment to flowering plants, and only some lichens spread over their surfaces.

At the verge of the wood stood a colossal fig-tree, spreading its branches to a great distance, and its horizontal branches throwing down roots into the ground, like the celebrated banyan-tree. The numerous blocks of granite which were lying below it might be compared to natural seats, while the wide-spreading branches formed an arbour that afforded most delightful shade, and invited us to rest our fatigued limbs. We had to traverse an immense solid pile of granite, perhaps a mile and a half in circumference, and 200 or 300 feet high. Numerous cavities, resembling the Kettle and Pans in Cornwall, proved the influence the weather had exercised upon this solid mass. *Cereastri*, the strange Melo-cacti, and a few specimens of the viviferous *Agava*, covered the highest summit; shrubs of *Deomanthus*, *Clusia*, and a small-leaved *Cassia*, formed the under-bush, about 50 feet below the summit. The *Cereus* is generally a token of sterility; and its upright six-sided columns, leafless as they are, do not aid in giving diversity to the surrounding scenery; nevertheless its long whitish blossom is of an elegant form. The inside, of a yellowish colour, is formed like the rays of a star. It diffuses during the night a delightful odour; and, as it is only at the midnight hour that it appears in its greatest splendour, there is a mystic interest attached to the plant, which is increased by its peculiar form. Long before the sun has reached the meridian, its flowers have faded, and hang down quite decayed. The large purple fruit succeeds, which is eaten by the Indians, and the pulp of which has a sweetish taste.

We descended, and entered another basin enclosed with mountains. Our path led now over savannahs, now through wood; and, as we had not met with any water for the last four or five hours, our thirst was considerable. We halted at noon. The greater number of our men had not yet come up, and we sent some of our guides forward to look for water. They returned without success. They brought, however, numerous fruits of the Cucurbit Palm (*Maximiliana regia*), which have a vinous taste, to which a European soon accustoms himself, although few like them at first.

After walking 3 miles through wood, we came to the river Manatiwau, glad to quench our thirst. It has dark water, and

falls into the Takutu. We halted for nearly an hour, to allow the stragglers to come up with us; but, knowing that some Wapisiana were still behind, who we believed would act as guides to those who had not come up, we at the end of that time resumed our march. We reached the Wapisiana settlement (which is named Tuarutu, after the mountain chain near which it is situated) a little after three o'clock.

The settlement consists merely of two huts, and its inhabitants were mostly old people. The young man whom we had met the day previously was a Macusi, who, having married a Wapisiana, had settled among them. They had three handsome boys—the eldest, perhaps, seven years—resembling each other so strikingly that if the difference of their age had not contradicted such an opinion, one might have thought they were born at one birth. We soon ascertained that there was not much bread to be procured at this settlement; but, as there were several others in the vicinity, where we were told they had plenty of cassada in the fields, I resolved to rest for several days, and pitched our camp in the vicinity of the settlement, near a small copse. Late in the evening we received information that all our men had come up, except the cook. A black man from the coast (Sororeng) had remained behind near the river Manatiwau, in case he should come up in the course of the evening.

28th.—We had received no tidings of the lost man, who had to ascribe his misfortune to his own imprudence, as he was warned repeatedly not to lose the Indian guide out of his sight. He had started before the hindmost party, who had rested themselves, and they had seen nothing of him since. I dispatched a strong party in search of him, and burned large fires on hills in the neighbourhood during the night.

A number of Wapisiana arrived this morning to greet the first white man who ever visited these regions. Some of them certainly presented a most grotesque appearance. One who, as we were told, was a chieftain, had a piece of calico wrapped round his loins; and his hair being turned backwards at the front of the head, that part was covered with masses of koucon, ornamented here and there with the white downy feathers of the powis. One of his followers carried a low stool, on which he took his seat, as soon as he had made his salutation by waving his hand twice or three times across my face.

I have already observed that the Wapisiana are taller men than the Macusi. This opinion was confirmed here. They looked with great curiosity at the different objects which we had brought with us, while their chieftain remained placidly sitting at the entrance of my tent, and received the reports of what the others saw remarkable among my luggage. It appeared to be

below his dignity to go and look himself; and, as there was no doubt some difficulty in describing to him such things as they saw for the first time in their lives, a most animated conversation was carried on, which drowned every attempt to put in a word on our side. Forks are, for those children of the savannahs who see them for the first time, the most miraculous things. One passed from hand to hand; and when I showed them the use of it, they broke out into a boisterous laugh, making very likely their own comments upon the use of a utensil far inferior to the one nature has given them.

The reserve of the chieftain melted away when he left the tent, and went to the temporary hut which we had erected for our kitchen. He inspected now in his own person the numerous utensils, which his eyes likely saw here for the first time; and the wonder of the party had no end when Sororeng, our interpreter, explained to them what use we made of them.

Among the numbers who had come to visit us was a Capoucre, a cross between a negro and an Indian woman. That race is generally stronger and more muscular than the Indian, and their hair is woolly, like that of the negro. There are, however, very few in British Guiana, but great numbers are to be met with in Surinam, where it appears a great many runaway slaves have intermarried with the Caribs.

I presented to the chieftain some trifles, and he promised to bring us a supply of bread the next day.

There are several settlements in the neighbourhood, each consisting merely of one or two huts. The soil is uncommonly fertile in the copses which are scattered among the savannahs; and a wish for independence may have induced men to settle in this straggling manner. Among the presents which were brought to us were large goobies filled with dried fish. The Indian is well acquainted with the effectual method of preserving fish, by subjecting it to the smoke of a wood fire, which acts as pyroligneous acid upon the meat; and it appears he is likewise aware of the method of preserving meat by keeping the air from it.

Some other Indians arrived in the afternoon; to my astonishment I recognised in one of these a vaqueira, or herdsman, whom I had seen at Fort São-Joaquim.

29th.—The party who had been sent in search of Hamlet Clenan returned the previous evening without success. Engaging all the Indians I could procure, and not exempting an individual of our expedition, I divided our force into three parties, and having desired Mr. Goodall and Mr. Richard Schomburgk each to lead respectively one of them, I took the command of the third, and gave orders to set out in three different directions towards the mountains, with the injunction that each party was to fire every

ten minutes to attract the lost man's attention, if he was still among the living. I found great difficulty in inducing the Indians to assist me in this search. As soon as they understood from the Wapisiana, who belonged to our party, that it was a black man who was missing, they ceased to feel the slightest inclination to stir. This hatred of the red man towards the black is remarkable, and is not confined to the Indians of Guiana, but prevails equally among those of Chili and Peru. I had the satisfaction of finding Clenan at two o'clock in the afternoon. He was almost in an exhausted state, and fear and fatigue had operated so strongly upon him, that I was at first apprehensive his reason was gone. He certainly offered a most piteous appearance. His wild looks, his clothes hanging in tatters round him, and his incoherent speech, sometimes laughing, sometimes weeping, showed what impression his misfortune had made on his weak intellect. But what amused our men, when they found he was otherwise whole and sound, was the remnant of a land-tortoise hanging round his shoulders, which showed that he had made his breakfast upon it, wisely preserving the remainder for his dinner. He had always shown the greatest abhorrence for this animal, and considered us very likely as bad as cannibals, when he was obliged to prepare it for our meals; and his repeated observation had been, that he would rather die than eat of it. How faithfully he had kept his vow when in necessity, was evinced by the small remnant of the land tortoise. I had provided myself with the necessary remedies for restoration, in case we should find him exhausted, which were used with full success. As he was too weak to follow us at that time to the village, I ordered the coxswain and one of the canoe-men to remain with him, and bring him next day to our camp. We arrived there at dusk; the others had reached before us, of course without success; and all were glad that in this instance also no loss of life of any individual was to be connected with our expedition. Petry's accident was still too fresh in their remembrance to allow them to have forgotten the dark forebodings of the superstitious.

We were now comparatively among the mountains. To the N. the Tuarutu raised its summit to about 1800 feet; the next highest hill to it being about 1150 feet above the Takutu. The Tuarutu chain is about ten English miles in its greatest length, and forms an irregular mass, enclosing savannahs and monticules of solid granite. Huge blocks of the same rock lie about in great confusion, and bear witness to some convulsion. A bare rock, resembling Ataraipu, which the Indians call Aikuwé, is the most remarkable feature of this knot of mountains.

A plain, where savannahs are interspersed with woods of no great extent, and here and there covered with hills which rise



from 150 to 200 feet above the Takutu, connects the Tuarutu with the Ossotshuni. That small mountain chain extends 11 miles in a N.E. and S.W. direction. Nowhere have I seen so many granitic and amphibolitic rocks as in the Ossotshuni mountains. Uruwai, Wapung or Wahuma, Curushiwini, are masses of granite which rise to a height of 1500 and 1800 feet, and white spots of quartz contrast in a most striking manner with the dark mass which otherwise presents such a gloomy appearance. The Wapi-siana of these regions relate that the tobano grows wild on Uruwai. To the S. of Ossotshuni commence thick forests, and the blue outlines of the Essequibo mountains break the horizon to the S.S.E.

*May 2nd.*—With a supply of provisions, and the promise of our Indian friends to provide more on our return, we started this morning after nine o'clock, and crossed an hour afterwards the rivulet Turerucatakurin. Its long name did not correspond with its importance as a flowing water. It flows into the Ossotshuni, which has its source in the mountain chain of the same name. Our way led along that chain, which we kept a mile or two on our right, and an isolated hillock of a pyramidal form was our guide. We reached about noon the small river Taramtibawau, certainly the most considerable we had passed. The waters were flowing over large shelves of granite; those parts which were not under water were covered with orchideæ nearly to the verge of the stream.

We passed the isolated hillock on our left, and directed our course towards some eminences, called Wawacunaba, from the height of which we enjoyed a most beautiful prospect over the savannahs. The mountain Vinudaua (Vindiau in my last map) was the most striking object. At this place the Takutu receives its first tributary of any consequence. It bore S.S.E. Behind Vinudaua we discerned the bluish outlines of a large and high mountain chain, in which I greeted old acquaintances. They were the Wanquwai and Amneu mountains, near the confluence of the Yuawauri, or Cassikityn, with the Upper Essequibo. Further eastward I noted a chain of mountains equal in height to the Wanquwai, which the Indians named Uassari, and I gladly recognised in this name a mountain chain which Humboldt mentions in the sixth volume of his "Personal Narrative," p. 523, but the latitude which he states is at least 40 miles too far north.\* They appeared to be high, surpassing the Tuarutu or Ossotshuni, but the distance did not permit me to judge whether they were wooded, or consisted, like the Ossotshuni, of bare granite. The rocks, which were scattered in fragments on the summit of Mount Wawa-

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\* Their latitude is about  $1^{\circ} 40' N.$ , according to some angles I took at the Tuarutu.

cunaba, were highly crystalline. We entered shortly after a wood, consisting of numerous palms of the genera *Astrocaryon*, *Bactris*, *Euterpa*, and *Maximiliana*; the wild plantain (*Phenakasperum Guianensis*) grew most luxuriantly, and often attained a height of 50 feet. The soil was a rich loam mixed with white sand. A small rivulet, the opposite side of which was grown over with *nastus*, or wild bamboo, afforded water, and our tents were soon pitched in its neighbourhood, shaded by the princely *Carolinea*. Some of its fruit burst during the night with a loud crack, scattering the seeds which they contained all around, many of which fell on the tent, making a noise like hailstones.

3rd.—Mount Vinudaua bore in the morning S. 26° E. We continued our course along the Ossotshuni mountains, and reached after two hours' march a deserted settlement on an eminence. On entering a wood I observed with pleasure the graceful *Mauritia aculeata*, the first I had seen since I left the Rio Negro.\* As on the banks of that river, so here it grew in clusters. The Wapisiana Indians call it *urukush*. We walked afterwards through a forest of *bactris*, among which the majestic turn-palm raised its head to a considerable height, and large clusters of its purple fruit contrasted strongly with the dark leaves of the *bactris*.

We met in the forest such a numerous body of Cushi ants (*Atra cephalotes*), that their number would be disbelieved if I were even to estimate it far under the truth. They were marching in an uninterrupted column about a foot wide, and three to four hundred yards in extent, towards their hill or nest, carrying bits of leaves which they brought from a tree 80 to 90 feet high. Some were occupied in bringing the leaves from the tree to its foot, where they were deposited, while others took them up and carried them to their nests. And although the ground was covered with their numbers, passing and repassing, and carrying loads perhaps five times their own size, no disorder was observable in their columns. They seize the leaf with their mandibles at one of the ends, and carrying it upright it appears like an umbrella kept over the body to shade the ant against the sun and weather. Some of the colonists call them, therefore, the umbrella ants. They are mistaken, however, as to the aim which the insect has in carrying the leaf in that manner; it finds it an easier way to carry such a burden, and takes up less room while marching towards the common nest. Here they amass masses of leaves which would astonish any one unacquainted with their habits.

These ants are great enemies to the agriculturists; and if their nests are in the vicinity of provision-grounds all cultivation ceases. Many a village, many a provision-ground, has been abandoned

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\* Journal of the Royal Geographical Society, vol. x.

on their account, as it proved impossible to raise a vegetable near them; cassada, yams, batatas, are alike subjected to their destructive propensities. Their hills are frequently several hundred feet in circumference, and from ten to twelve feet high, and so undermined that it is dangerous to walk over them.

Among the palm-trees grew a large number of juvia-trees (*Bertholletia excelsa*), the fruit of which is well known under the name of Brazil nuts. They had done bearing, but we found a few of the large ligneous fruit on the ground, which we gladly opened to procure the tasteful nut, more delicate in its fresh state than when shipped across the Atlantic.

We now ascended hills of 150 to 250 feet in height; their summits were dome-shaped, and covered with numerous fragments of angular quartz. I observed a large fig-tree, perhaps 120 feet in height, with large tabular excrescences like the mora-tree (*Mora excelsa*, Beth.), and leaves similar in appearance to those of the *Caladium arborescens*, or *Muc-mucu* of the colonists. On the summit of one of these hills large plates of mica protruded among fragments of quartz, which our Indians collected eagerly as curiosities. We next descended a hill several hundred feet, and, coming out of a copse, saw two huts before us, which were inhabited by Macusi Indians. The chieftain of the place, whose name we understood was Tuma-tuma, awaited our arrival, with great indifference, in his hammock. He was one of the stoutest Indians I had seen.\* While our guides made him acquainted with the

\* He allowed me, in his good nature, to measure him, after we got better acquainted, and I add here a comparative measurement of him and another Macusi Indian, by the name of Mingai, of nearly the same height.

	Chieftain Tuma-tuma, of Marika.	Mingai.
	Feet. in.	Feet. in.
Common height . . . . .	5 4	5 5
Long diameter of the head from the superior angle of the occiput to the chin . . . . .	0 10	0 11
Circumference of the head round the forehead above the ears . . . . .	1 10	1 10·2
Upper extremity, from the head of the humerus to the end of the middle finger . . . . .	2 5	2 4
Lower extremity, from the head of the femur to the heel . . . . .	3 0	3 0·3
Circumference of the upper part of the arm . . . . .	1 0·5	0 10·8
Ditto of the lower, below the elbow . . . . .	0 11·2	0 9·7
Circumference of the upper part of the thigh . . . . .	1 9·5	1 7·8
Ditto of the calf . . . . .	1 2·3	1 1·4
Breadth of the chest between the shoulders . . . . .	1 9·3	1 5
Circumference of the chest . . . . .	3 3·7	2 11
Ditto of the abdomen . . . . .	3 4·6	3 0
Length of the right-foot . . . . .	0 10	0 10
Ditto of the right-hand . . . . .	0 7	0 6·7

object of our journey, he only gave his *ahem*! without betraying the slightest interest in us or those who were with us. The females, however, did not constrain their curiosity in such a determined manner as Tuma-tuma. By that sort of freemasonry which prevails among the fairer sex of God's creation, they soon became acquainted with the Indian women in our train, and, inviting them into their huts, no doubt received as much information as they desired.

Our tents were erected near the banks of the Watiwau, which we had crossed a few days previously as a mountain torrent: here it had dwindled to a small brook, only a few yards wide, and at present forming merely pools. It has its source 5 or 6 miles further to the southward.

The inhabitants of the settlement Maripa consisted, at the time of our visit, of only 20 individuals. A sickly-looking person, who had dressed himself, according to the civilised fashion, in shirt and trowsers, and covered his head with a red woollen cap, made his appearance and greeted us. He was some relation of the chieftain, and appeared to pride himself not a little upon being dressed like ourselves. Whence he had got his suit of clothes at this distant spot was for some time a riddle to us; but, as we afterwards learnt that he was a great trainer of dogs, of which the number was at least equal to that of the human inhabitants of the village, we conjectured, perhaps rightly, that he might have received it in exchange for one of his canine pupils.

\* There were several other settlements in the immediate vicinity; and, as our expected arrival had been announced the previous day by some Wapisiana from Tuarutu, who, anxious to carry the news of our visit, had not minded the journey of two days, we saw soon after our arrival a party coming to greet us, with their chieftain at their head. These two important men, the chieftains of Maripa and of the neighbouring settlement, were a true exemplification of Pharaoh's dream of the fat and lean kine. The new comer was a tall lean man, with a ghastly expression, which was much increased by having lost one of his eyes. He told me, through our interpreter, that he would order some bread to be made for us, and would show us, if we wished, the way to the sources of the Takutu, where he had been very recently.

I had understood, from some of the Indians at Tuarutu, the sources of the Takutu were at Mount Vinudaua: however, we learned here that this river only received its first tributary from Vinudaua, and has its source further to the S.E.

The coxswain had sprained his ankle, and, expecting that he should be able to walk if a day's rest was afforded him, we delayed our departure. The reserved manner of Tuma-tuma gave way before four-and-twenty hours had elapsed. I rather think

he at first mistrusted us. He came to my tent and inspected what appeared remarkable to him. In spite of his size he walks briskly; and before he became so stout he must have been a handsome Indian. His eyes were rather oblique, and there was a peculiarity in the orbital process, the horizontal diameter of which is generally with the Macusi Indians from 2·3 to 2·8 inches, while in his it measured only 1·5 inches. His wife was much younger than himself; she had two children, the youngest about five or six months of age, and was again far advanced in pregnancy.

I bought here a young tiger-cat, it had been caught only a few days previously, and possessed all the wildness of its race. It was too young to judge with certainty, but I think it was either a specimen of the *Felix pardalis*, or the *Felix macroura* of Prince Maximilian of Neuwied. The number of tiger-cats, or jaguars (*Felix onza*), must be enormous in this neighbourhood; the women and children wear tigers' teeth round their necks, to which they ascribe talismanic power. I possess two canine teeth of a jaguar, which had been killed, only a few days previous to our arrival, near the village, which measure  $3\frac{1}{2}$  inches in length and 3 inches in circumference round the thickest part of the root. As there are no cattle within 80 or 100 miles of this spot, they must necessarily live entirely upon aguris, peccaries, and deer. The Macusi pretend that they attack man, and told us many wonderful stories of hairbreadth escapes.

We saw several baskets of Brazil nuts in their huts, and were told that they were very numerous about Vinudaua. It appears that the tree prefers stony soil, and a moderate height above the sea. I have never seen the *Bertholletia* at a greater height than 1500 feet above the sea, and scarcely lower than 400 feet (on the banks of the Guidaru). The distribution of this useful tree is however extensive. It is found on the banks of the Amazon, the Orinoco, the tributaries of the Essequibo, and as far E. as Berbice. Its geographical range is, very likely, between the meridians of 57° and 63° W. of Greenwich, and the parallels of 6° S. and 4° N.; the most northern parallel where I have met it was the third.\*

*May 5th.*—Our number having been increased by the lean captain, who was to form our guide, and four of his attendants, we started this morning at 8 o'clock.

We had to pass the settlement of our lean friend, and had occasion to admire the neatness of his hut. In lieu of walls, it was closed in with the bark of a tree; and the interior was cleaner

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\* Near Pukassanti, a Carib settlement on the banks of the Guidaru, in 3° 4' N. latitude.

than the generality of Indian huts. The utensils of the chase, bows and arrows, and the blowpipe, were properly arranged: and we found the women had been working on some large earthen pots, which, when we consider they were made without the potter's wheel, merely with their hands, deserved every praise.

After it had been settled, by means of the cudgel and the shrill voice of the squaws, which dogs were to accompany their master, and which to remain at home, we continued our march, and soon after entered a thick forest, which we did not again exchange for savannahs until our return. Our course was mostly in a S.E. direction, through a forest, very likely not trodden before by European feet. As it was merely a hunting-path, the tracks were soon lost, and we had to trust to our guide's Indian sagacity to wind his path through the wood, which surpassed even tropical exuberance. I observed several trees in our path which I had not noticed before; amongst others a gigantic tree with excrescences like the remarkable Yaruri, or Massara,\* the trunk of which, from 5 to 6 feet in diameter, and to the first branches perhaps 50 feet high, has the appearance of being fluted, or as if it consisted of numerous slender trees. The present species differed only in its trunk being not so much fluted, and the tabular projections of the lower part being much larger than those of the true Yaruri. The Macusi called it "itsha:" and, if the seeds which I collected at its foot belonged really to it, as I was told by the Indians—who, by-the-bye, eat them, after being boiled—this tree belongs to a different genus and a different order than the Yaruri which Martin ranges under Apocynaceæ.

We followed the dry bed of a stream. Among some leaves which the wind had thrown down from the neighbouring trees, and which were being heaped up at a bend of the river's bed, I observed a yeast-like matter; curious to see what was under it, I pushed my stick into it, when a hollow grunting noise issued from it. To my astonishment I was told that it came from a frog. How the animal makes this whitish foam, which would have filled half a bucket, and for what purpose, remains a riddle. There was no spawn visible; and the yeast-like matter or foam might have been compared to anything else but to the whites or mucus in which their eggs swim after the spawn is emitted. I was really sorry that I did not succeed in procuring the frog, or at least seeing it, as all our search among the dry leaves proved useless. The Wapisiana called it *pari*, and the Macusi *truwé*.

We passed several wild-bees' nests, constructed in hollow trees. These insects have no sting, and their honey, or *mapa*, as I observed previously, has an acidulous taste. If some unlucky

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\* The Yaruri is a new species of *Aspidosperma* (Martin).

passer-by knocked against the tree or their entrance, which is frequently funnel-shaped, and constructed with a sort of mortar made of earth, they appear in legions and settle upon him; and although they do not sting they prove very troublesome, especially if they get into the hair, which they seldom fail to do. What a scampering over bush and stick, when by accident or in frolic the winged colony had been disturbed! The Indian runs generally on such occasions with his head bent downwards, and tries to get out of their reach in the speediest manner possible. We attempted to follow his example, but generally knocked our heads against the branches, which he knows carefully how to avoid.

We had been marching four hours without finding any water; the discovery of a hog plum-tree (*Spondias lutea*), with a quantity of ripe fruit, was therefore highly welcome. It appeared a flock of peccaries had been regaling themselves when our arrival must have driven them to flight. Some of the huntsmen followed, but returned unsuccessful. The hog plum-tree is by no means scarce in Guiana; it forms a high wide branching tree, the wood of which would prove useful.

We stopped at four o'clock, near the banks of a dry river, much fatigued, and thirsty in the extreme. We had not found any water in the course of our whole day's march; and, although the Indians kept digging holes in the ground, it was without success.

The followers of our guide allowed themselves scarcely any rest before they were assiduously occupied in erecting for their chieftain a hut of palm-leaves. One acted as cook, and grilled upon a stick part of a powis, which had been shot that morning. A plate of delf, in the possession of which our guide no doubt prided himself not a little, was then carefully taken out of the basket, or rather, and put before him. He dined in solitary state; after he had finished, and the plate had been carefully put away, his attendants ate the remainder.

6th.—Fortunately a short hour's walk brought us this morning to the Takutu; and although the water appeared stagnant, and was covered with a greenish film, our thirst was too great for us to refrain from drinking of it.

The bed of the Takutu was only 10 or 12 feet in width, and its waters were merely collected in pools, without flowing in an uninterrupted stream. The colour of the water is almost black, from which circumstance the Wapisiana call the Takutu Butivan-uru, or black river. It would certainly be a misnomer at its lower part, where the water, before it is joined by the Mahu, has almost a bluish colour. Its course through the ochreous and clayey savannahs changes its colour to a muddy white, and during the dry season to a bluish colour. I have not been able to

ascertain the origin of the name Takutu; perhaps it is synonymous with black river.

We followed the bed of the river for several miles upwards. An Indian, who mounted a high tree, saw some small hills in the direction of N. 80° E., distant a few miles, but no mountains were visible. A small stream, now perfectly dry, joined the Takutu on the right bank; and shortly after another on the left, likewise dry. Above the junction of the latter the Takutu dwindles to a rill, bordered by high trees and thickets of wild bamboo (Kappu in Macusi). The vault of heaven was scarcely visible through the arches which the bamboo, and numerous branches of trees, form along its banks, and consequently any astronomical observation was rendered next to an impossibility. I recollected, however, a fine rocky platform, which we had passed, and when the river was wider than it generally is, being extended by the passage of the rocks. We returned to it, as the most eligible place for my observations. This spot is in 1° 5' N. latitude,\* and 19 miles W. of Pirara.

The Takutu flows from hence N.E., and receives from Mount Vinudaua approximately in 1° 55' N. lat., a tributary of nearly its own size; it then takes a north-western course through savannahs interspersed with wood, and having passed the Tuarutu mountains to the E. of that chain, it receives the waters of the Watiwau, a river nearly of its own size. Its course is now a point or two to the E. of N., through bare savannahs and its tributaries, merely savannah rivulets, until it is joined by the Mahu in 3° 35' N. lat., and 24 miles W. of Pirara. After the conjunction of the two rivers the stream follows a south-western course, and receives the river Zuruma or Cotinga on its right bank: it ultimately falls into the Rio Branco, a few hundred yards above the site of Fort Saõ Joaquim in 3° 1' 46" N. lat.

I calculated the whole course of the Takutu, from its source to the junction with the Rio Branco, at 200 miles. The last 50 miles it makes a retrograde course (namely S.W., its course having been previously N.) towards the Rio Branco.

7th.—Starting at an early hour, the return path was accomplished in a much shorter time than our outward journey; and I found an opportunity to determine on my arrival at Maripa the difference of longitude between our camp, at the sources of the Takutu, and that village, by horary angles of the sun; only twenty-four hours having elapsed since I had taken similar angles at the Takutu, the difference of longitude (21s. 58 in time) can be the more depended upon.

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\* This is the mean of the meridian passages of several N. and S. stars, but not the mean of the circum-meridian altitudes which have not been calculated as yet.



The intensity of the magnetic action manifested itself at Maripa by 100 oscillations in 2m. 51s. 27 at 88° Fahr. by needle L (a); and in 3m. 56s. 89 at 85° 8 Fahr. by needle L (b).

The thermometer under our tent kept generally in the morning at 6 o'clock at 70° Fahr., and rose, between 2 and 3 o'clock, to 98° Fahr.; it then began to sink gradually to 84° at 6 o'clock in the afternoon, and stood from 72° to 74° at 9 o'clock in the evening.

The latitude of Maripa (mean of meridian altitudes) was 1° 54' 37" N., its difference of longitude 24 miles W. of Pirara.

8th.—I found myself under the disagreeable necessity of leaving the coxswain at Maripa until he considered his foot so far restored that he could follow us. Being amongst friendly Indians, and amidst plenty of provisions, I considered it a much more prudent plan that he should await the cure of his sprained ankle, than venture upon the tedious and fatiguing march we had before us.

Our guide to the sources of the Takutu, the one-eyed captain, promised to accompany us, with several of his followers, as far as Tenette, which we gladly accepted, as it was requisite to take from this place, and from Tuarutu, the provisions for the whole of our return journey to Pirara. We knew from experience that we could not procure any provisions from Tenette.

Our party amounted to nearly fifty individuals, including women and children, besides a number of dogs, which would have out-numbered the packs of many a fox-hunting squire. There were twenty-five of the canine race, and when they began their barking noise in chorus, there was enough to make one momentarily deaf. The finest among their number was, however, a dog from the Taruma nation, with which I was so much pleased that I induced the owner to part with it for a gun. Its name was Tewanaud. The Woyawai and Taruma are considered the best trainers of dogs; and these animals constitute a kind of merchandise, or article of barter, between them and their neighbours. This dog was of an uncommonly large size, and as it appears a well-marked variety, I have added below a more detailed description. I have only to regret that it was emasculated, a custom which the Taruma follow under the supposition that they grow fat under it.\*

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\* The Taruma dog :—Well formed, something between a greyhound and pointer; head broad, muzzle long, moderately pointed, ears erect, neck long; tail long, carried erect, slightly arched, the hair on it short; the chest rather narrow; the belly drawn up; eyes brown, pupil black; prevailing colour white, with large black patches; head and ears black, round the eyes, towards the angle of the mouth; point of muzzle white; root of tail black, otherwise white to the point; hair short. Its length from the tip of the nose to the point of the tail 4 feet 3 inches, of which the tail was 1 foot; height 1 foot 11 inches; girth of the body 2 feet; girth near the hind feet 1 foot 6 inches; muzzle, from the superior angle of the head to the tip of the nose, 9.3 inches; length of ears, 3 inches; space between ear and ear 4.7 inches; circumference of the muzzle

We reached our old quarters at the Tuarutu mountains at 11 o'clock on the morning of the 9th of May; and as I considered it necessary to ascertain here the position of some of the neighbouring mountain groups by trigonometrical operations, and to procure a larger stock of provisions, our departure was delayed until noon of the 11th.

11th.—I resolved to cross from the Takutu to the Rupununi, while Mr. Richard Schomburgk, who was then suffering under a tertian ague, returned with his party direct to the Cursato mountains. We had marched about 4 miles over savannahs, interspersed with copses, among which I saw numerous specimens of the beautiful white orchidea, which I found first near the Watiwau, when we crossed, after 1 o'clock, the river Warimi-wau, just a little below the junction of the Paipaitshi-wau. I discovered here a tree with large purple fruit, which resembled in taste our common cherry, with a slight acidulated flavour. The Indians call it Turuaku; and I would have considered it a *Eugenia*, or a genus allied to it, if the presence of stipulæ did not argue differently; its leaves are opposite, and there are small stipulæ at the base of the leaf. The farther we advanced to the E. (our course having been mostly N.E.) the scarcer became those copses which had hitherto almost prevailed over the savannahs; and about 3 o'clock we again entered the open savannah, with only here and there a curatella tree, or some *Malpighiæ*, and numerous *Mauritia* palms. The highest summit of Tuarutu bore then N. 43° W.; and a small mountain chain called Tshuna, along the western foot of which we understood the Takutu was flowing, bore E. by N.

It was nearly 6 o'clock before we reached the Takutu, here about 80 feet wide, and flowing over numerous blocks of granite. We found it not difficult to step across without wetting our feet, so numerous and large were the rocks which impeded its course.

12th.—After I had taken a set of horary angles of the sun, for the determination of the difference of longitude, we continued our march. Our huntsmen had brought in this morning a couple of deer, the first which they had procured since we left Au-uru-paru. It is remarkable that at the Tuarutu and Ossotshuni mountains, the deer of the savannah is not to be found, although there is savannah ground between them.

The savannahs consisted now of undulating ground, the height of the summits being from 40 to 50 feet. They are covered with fragments of angular quartz rocks, which rendered our path very fatiguing. The Macusi Indians call these rocks "wata-yeku,"

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just below the eyes, 8·7 inches; fore foot, from head of shoulder, 1 foot 10 inches; hind foot, 2 feet. The dog from which the measurement was taken might have been two years of age.

and the small nodules of clay ironstone which sometimes replaced the other, "mari-yeku." These nodules are sometimes pisiform, and have a black shining surface. A species of grass, which is very common in the savannahs, is called "vannah" in Macusi, and the spots which are covered with it "vandai." Whether this is the origin of our adopted word "savannah" I will leave the etymologists to decide. However, since we know it to be of American extraction, the coincidence is striking. The word "ite" expresses, however, savannah of any description.

We experienced at noon one of the strongest whirlwinds I had witnessed upon savannahs. It whirled leaves, sticks, and whatever it could seize, several feet into the air, and raised a column of dust of 200 or 300 feet in height. The Macusi called it "uranan;" and I understood such phenomena are very frequent here. The peculiar position of the mountains may give rise to them. The column of dust took a S.S.E. direction. The way in which the Macusi pronounce the word "uranan" reminds me of "hurican," likewise an adopted word of our European languages.

A poor goat-sucker attempted to escape its influence, but being seized was whirled for a considerable distance into the air. I had been frequently amused, during our monotonous walk over the savannahs, with the strange manners of the Caprimulgi, or goat-suckers, when they saw our large column approaching their resting-places. They generally cowered down, and ducked their heads to pass unnoticed. On approaching them nearer they watched every step; and if we stepped on one side, under the impression that the bird in its stooping position cannot look around, it turned so swiftly that the Indians said it had a pair of eyes at the back of its head. Only when approached within a few feet it takes to the wing. The Indians have the greatest superstition with regard to this bird, and would not kill it for any price. They say it keeps communication with the dead, and brings messages to their conjurers. Even the common people on the coast retain in a great measure this superstition, and hold the bird in great awe. Its nocturnal habits, the swiftness and peculiarity of its flight, and its note, which breaks the silence of the night, have no doubt contributed to the fear which Indians and Creoles entertain for the Wacarai or Sumpy bird.

The small chain, Tshuin, consisting of hills from 400 to 450 feet high, bore this evening, from our camp, S., distance about 6 miles.

We had stopped at rather an early hour, as our guides told us we should find no water before darkness came on, if we marched farther. It is advisable at all times to pay attention to what the guides observe with regard to water, as I know from experience,

that, anxious to continue the march, I once or twice did not mind their advice, and had to pay for my imprudence by suffering the tortures of thirst.

Our tent was erected near a small river, and in the vicinity of some large pools of water, cold, and nice of taste. These natural reservoirs are a great blessing for those who have to traverse the arid savannah, where the traveller is exposed to the direct rays of the sun, and suffers the more from thirst. Numerous temporary huts are therefore generally in the vicinity, which are from time to time repaired or renewed, as the circumstance may require, by those who pass the road, and use them as night quarters. Our camp was this night in  $2^{\circ} 19'$  N. lat., and about 5 miles W. of Pirara.

The thermometer stood, at 2 o'clock in the afternoon, in the shade of the tent, and surrounded by trees, at  $96^{\circ}$  Fahr.; at 3 o'clock at  $89^{\circ}$  Fahr. The stars were clouded and undefined.

13th.—We broke up our camp, and started at 6 o'clock. The morning was clouded, and a strong breeze (from 5 to 6) blew from the N.E.; the thermometer  $71^{\circ} 5'$ . The hills continued to alternate with low grounds, and rendered our march very monotonous. These savannahs present many inequalities. They consist of ranges of hills, having more or less a N. and S. direction; and the aspect of numerous *Mauritia* palms convey the hope to the weary traveller, when seeing them in the distance, of enjoying at their foot a refreshing drink of water; or he fancies he sees it flowing in the gullies on the sides of the low hills, which he observes to have been torn by torrents of water. In lieu of this, however, the ground under the *Mauritia* is as dry as the surrounding savannah; and the gullies present only red ochreous clay, denuded of grass, and covered with the debris of quartz rocks.

Our monotonous march was interrupted by a fox-hunt. The dogs started a savannah fox (*Waé-ré*, in Macusi), which led them a famous chase. They followed Reynard in full cry—the Indians shouting, and encouraging their dogs. When overtaken, he defended himself with great obstinacy. The fine large dog "Tewanaud" seized him by the neck and worried him; and he was lying apparently lifeless on the ground, when unexpectedly he jumped up, seized the nearest dog by the nose, which, with most piteous howling, tried to disengage himself from such an attack, but in vain, until its master killed the *Waé-ré* with a stick. The fox of the savannahs is somewhat smaller than the European fox. It is of the colour of our hare; whitish under the throat; and along the back to the tip of the tail, which is pointed black, runs a black line. The feet are darker below the knee-joint; the neck below the ears is of a reddish brown; the head, from ear to ear, lighter; along the snout a little darker; the eyes are brown,

with a dark blue pupil. I have given here the description, as the Waé-ré appears to be the same species as Azara's Agouara guazon, the *Canis jubatus* of Desmarest.

We had reached the highest ground between the two rivers (the Takutu and Rupununi) at half-past 8 in the morning. I considered it 150 feet above their level; and as the distance of the Takutu is 12 miles from hence, and of the Rupununi merely 6 miles, it will be observed that the rising of the ground is more gradual from the Takutu than from the Rupununi.\*

Our course was N. 56° E. At the horizon, in the E.N.E., I observed the granitic hills Tambaro, on the summit of which I was in March, 1838, and thus found an opportunity to connect the present survey with the former. Further eastward we saw the Pararaima mountains, their western declivities inhabited by Atorai, the eastern by Taruma. We entered at noon the Wapisiana settlement, Cau-urua, consisting of five huts. The inhabitants were not numerous, scarcity likewise prevailing at their settlement; and the greater number had gone visiting those of their friends who were more plentifully provided with the staff of life. A dwarfish old man, the smallest Indian I have seen, made us a long speech, which Sororeng interpreted as conveying to us his regret that they could not give us a supply of provisions; but as we had enough, and did not intend to stay longer than the next morning, I told him to console himself on that head. Towards evening several of the other inhabitants came in, who had been fishing, but, as it appeared, with little success. Their whole body was painted black: some of the figures exhibited labyrinths, others grecques.† Among the females was one who distinguished herself by her fine figure and handsome features.

We had erected our tents among a number of Parica trees (*Mimosa acacioides*, Benth.), the seeds of which are used by several tribes of Indians along the Amazon and Rio Negro—namely, the Uaupes, Puros, &c.—in the same way as the Otomacs and Guajibos at the Orinoco use the bean of the *Acacia niopo*. They are pounded to powder, burnt, and the smoke inhaled; or the powder is put into the eyes and ears, which produces a state of intoxication bordering on madness, and during which time (and it lasts for hours) the Indians have no command of themselves or of their passions.‡

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\* I ascended some of the hillocks in the neighbourhood, and took a number of angles. It appeared to me that the line of division between the basins of the two rivers runs here in a N.N.W. direction.

† The Macusis call these figures "imeun-casa." Those, however, which we find upon rocks, and appear to be the handicraft of an extinct nation, are called "ta'-emongkong."

‡ Compare "Journal of the Royal Geographical Society," vol. x., and Humboldt's "Personal Narrative," vol. v., p. 662. It appears, after all, that the chemical properties

Fowls are the only animals which the Indian of Guiana domesticates, and of which he has a large number around his hut ; but he raises them only for his diversion, as he makes neither use of their eggs nor of their flesh. Among those which we saw here I was struck by the great number that were perfectly white ; and I admired, particularly, the beauty of two cocks, of pure white, and large size.

Towards evening I walked to the Rupununi, which, in an E.N.E. direction, is about a mile and a half distant from Cau-urua. I found it dwindled to the size of the Pirara ; its water was dark-coloured, and its bed studded with rocks. The Indians said that its source was distant from hence, in a S. by E. direction, about a day's journey ; and that it had its source upon the savannah, among Mauritia palms. It is remarkable that the waters of the Takutu and Rupununi are in their upper courses black, and in the lower whitish. The same may be observed of the Demerara ; and I have little doubt even the gigantic Orinoco has black water near its sources. The riddle of this peculiarity, which I have traced in all rivers of Guiana near their sources, is far from being solved. Baron Humboldt is inclined to restrict it to the rivers between the parallels of  $5^{\circ}$  of N. latitude and  $2^{\circ}$  of S. latitude.\* But the waters of the Demerara, the Barima, &c., in a far more northerly latitude, are as black as those of the Rupununi and Takutu near their sources. It would be remarkable if that property were only peculiar to Guiana, taking that territory in its greatest extent, and including what was formerly called Spanish and Portuguese Guiana.

I found the latitude of Cau-urua  $2^{\circ} 28' 25''$  N. ; and the difference of longitude about 1 mile W. of Pirara. The direct distance between the Takutu and Rupununi is therefore, in a S.W. direction, 20 miles. The thermometer showed, under the shade of the Parica-trees, at 3 o'clock, p.m.,  $90^{\circ} 3'$  Fahr. ; at 7 o'clock,  $80^{\circ}$  ; and 9 o'clock,  $77^{\circ}$  Fahr. On our departure, next morning, it showed, at 6 o'clock,  $73^{\circ} 5'$  Fahr.

14th.—We crossed the rivulet Cau-urua—from which the village has received its name—and took the pyramidal summit of Manette as our guide over pathless savannahs. The settlement having been only lately erected, their paths of communication were not as yet established with the neighbouring villages. Saeraeri, and the strange rock Dochlopan, formed again the striking object in the landscape ; and the dome-shaped mountains of Cursato rose in the western horizon, and were greeted as old

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of the Mimosacæ are the stimulant powers which exhilarate and, inhaled in superfluity, madden the Indians, although Baron Humboldt doubts it, and ascribes it to the effect of the calcined lime which the Otomacs mix with it.

\* "Personal Narrative," vol. v., p. 188.

acquaintances. We crossed, at 10 o'clock, the creek Canaru, which flows into the Rupununi.

The fragments of quartz which covered the savannahs appeared more numerous than on the previous days; sometimes huge blocks of the same formation pierced the soil. Our path was fatiguing in the extreme, and our feet blistered and injured by the sharp-pointed rocks. The greater part of the Europeans were either without shoes, or that necessary article was in such a condition that it no longer afforded the desired protection against the quartz rocks. I found sometimes specimens of a motley appearance, at other times it had a violet coat, like amethyst. The white quartz possessed considerable transparency; but specimens like Scottish cairngorum appear to be entirely wanting in Guiana. The semi-translucent rose-red and milk-white quartz are the most prevailing.

We arrived at half-past 1 o'clock at a settlement consisting of two huts, built on the declivity of the Pinighette mountains. The highest summit of this little chain is about 800 or 900 feet high, and of a pyramidal shape. The huts had such a slovenly appearance that I gladly returned to the foot of the mountains, and ordered a place to be cleared among the high grass for the erection of our tents. While thus occupied, I saw one of our men and an Indian starting backwards, with horror depicted in their faces; a large rattle-snake, which the Indian saw coiled up under a bush they were just on the point of cutting down, was the cause of it. Mr. Goodall had been sitting near the bush for some time, unaware of the dangerous neighbourhood he was in.

The appearance of the sky had changed; although periodically clouded for the last fourteen days, it changed now to an uniform purplish-grey, and portended the approach of the rainy season. I procured some horary angles of the sun in the afternoon; but my wish to determine the latitude could not be executed, the sky being too cloudy.

The water which flows from the south-western side of the Pinighette mountains goes to the Rupununi. On the north-western side the Sawara-au-uru has its source, which, as previously observed, affords a portage between the Takutu and Rupununi. The direction of the small chain is about N.E. by N. and S.W. by S., and their extent 2 miles.

The settlement afforded a pretty prospect over the savannahs; and I noted, with surprise, the natural pyramid of Ataraipu, which even at that distance overtopped the mountains in its neighbourhood, and was a striking object in the landscape. It bore nearly N.E. by E., and was about 45 miles distant from Pinighette.

15th.—We passed between the Pinighette and Manette moun-

tains, and now traversed comparatively level savannahs. The small river Sawara-au-uru turns towards Saeraeri.

We halted at the rivulet Paiwu-yau, or Dutch River, where we refreshed ourselves with a delightful drink of cool water. The mountain Duruau, the highest summit of which may be 2500 feet, bore, at half-past 10 o'clock, N. 15° E., distant a mile. This group is uncommonly rugged and steep, and forms an angle, one of its sides having a S.W. by S. direction, the other standing at W.N.W. A number of groups, only divided by small passes, trend from Duruau, in a W. by N. direction, towards Ursato, or Cursato. Manoa is the highest next to Duruau. We stopped near Mount Pausette, opposite the southern point of Cursato: although only a few miles from Tenette, we were so fatigued that we could not accomplish the distance.

16th.—We arrived at Tenette at 10 o'clock; and as we had been day after day on the march since we left Tuarutu, it was necessary to give ourselves a day of rest. On our arrival at Tenette I saw the impossibility of returning in our canoes, the Takutu having fallen still more since we left that place; I abandoned them, therefore, and I succeeded in engaging the necessary number of Indians, in addition to our regular crew, to assist in carrying our baggage overland to Pirara.

17th.—I repeated the experiment of ascertaining the magnetic force, and found the result differed only .92 by needle L (a), and .24 by needle L (b), from the one which I obtained on the 22nd of April.\*

18th.—It rained and thundered so severely this morning that it was half-past nine before we could start; and, after an uninterrupted march of 4 hours, and almost under constant rain, we halted on the banks of the river Scabunk or Catu-au-uru.

I observed here a splendid tree of the order Labiatae, which resembled *Hyptis membranacea* in its floral leaves, only that in this instance the floral leaves were of a fine rose-colour, much larger than those of *Hyptis membranacea*, and were connected with the Calices. The flowers are in cusps, and small, and of a bluish colour.†

\* May 17th.—Time of 100 oscillations by needle L (a) 2m. 52s. .08. Time of 100 oscillations by needle L (b) 3m. 36s. .45. Mean of Thermometrical Observations at Tenette.

Period, 1842.	Forenoon.		Noon.	Afternoon.		Remarks.
	6 h.	9 h.		3 h.	6 h.	
May 16th to 18th . . }	73° 25'	78° 67'	85°	88° 33'	80° 33'	Clouded, May 17th; thunder and rain.

† Specimens of this remarkable tree have been sent to Mr. Bentham, the learned author of '*Genera et Species Labiatarum.*'



19th.—Opposite our camp, on the right bank, were numerous plants of the singular *Ionidium Itubu* of Aublet, which diffused its delightful odour. It has an irregular corolla, and the labellum is uncommonly large in comparison with the other petals: its size is nearly 1 inch by 7 lines in breadth. This plant, which the Brazilians call *Praya da praia*, or *Praya bianca*, is estimated by them the best remedy against dysentery; and the root is often sold as true *ipecacuanha*, to which it approaches very nearly in its properties.\* According to St. Hilaire, the inhabitants of the Rio Grande do Norte consider the *Ionidium Itubu* a specific against gout.

The river Takutu meandered through the savannahs a mile or two on our left hand. There was no path over these savannahs; and we directed our course to the western angle of the Canuku mountains. We crossed at noon the Sawara-au-uru, which, swollen by the rain of yesterday, ran swiftly over numerous rocks, and rendered our fording it, if not dangerous, at least liable to lose our footing upon the smooth rocks. We ought to have stopped here, but, anxious to reach Pirara before the 24th of May, we continued our march, and soon suffered from want of water. How deceptive proves in such an instance a species of grass, of a light green or rather a bluish colour, which in the distance and influence of the mirage has entirely the appearance of pools of water! We halted near Mount Curatawuihuri, which forms the most western point of the Canuku chain. The Indians found some brackish water, with which we were obliged to satisfy our thirst.

20th.—Started at half-past six, and rounded the Canuku mountains, the northern side of which we followed now at a distance of a mile or two. We passed the rivulet Maripa-outé (circuit river), and where we issued from the small forest of Cucurit palms, which girt its banks, we passed a ruined village.

The village near Ilamikipang, where I spent several days in 1838 to look for the Urari, and see the preparation of that poison, was abandoned; several of its inhabitants had died, and the others had left, fearing that their sojourn at that place was displeasing to the evil spirit. The same was the case with the Macusi settlement Quariwaka, where, at the period referred to, I found ten Indian huts inhabited; not one was left; only the bare ground denoted that there had once been habitations. However, at a short distance from the site of that village, we saw three huts, built by some of the former inhabitants of Quariwaka: they called their settlement Curata-kiu.

In one of the houses we noticed the apparatus of the most famed

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\* Kunth's *Handbuch der Botanik*, p. 564. The *Ionidium Itubu* grows in abundance round Pirara.

Urari boiler of the Macusi tribe. Unfortunately he had paid nature's debt; and his numerous utensils, consisting of filters, sieves made of palm-leaves and fibres, pots, &c., were lying unused in the corner of the house, in which he himself was buried. Opposite the village is a remarkable rock of granite, with a rounded piece of white quartz in the middle, which shines, when the sun reflects its rays upon it, like the Kaira in the mountain-chain, which takes its name from it. The Macusi call this rock Uruqua-ka-epping.

21st.—We reached Awarra towards evening, having accomplished this day the greatest distance we had made during our present journey, namely, about 20 miles. If it be recollected that we had to march over open savannahs, and a path covered with fragments of conglomerate rocks, under a noon-tide heat of 120° Fahr., it cannot be wondered at that every individual was glad to sling his hammock on our arrival. As many of the Indians who accompanied us resided at Awarra or in the neighbourhood, it caused a great concourse of people, anxious to see their relations after an absence of two months.

We learned here that the military boats, with a supply of provisions for the detachment at Fort New Guinea, near Pirara, had arrived two days previous, and we were most anxious to proceed onwards, under the expectation of finding letters from absent friends; but our limbs refused their duty. However, we started next morning before daylight, and reached Pirara shortly after 8 o'clock, A.M. A large package of letters and a file of newspapers was a most welcome present, which awaited me on my arrival. After an absence of five months from Demerara, information from Europe, or even from the colony, is an enjoyment which only he who is transplanted in a wilderness like ours can appreciate sufficiently.

We had been absent two months from Pirara, and, although exposed to the extreme heat and constant fatigues, no serious sickness had occurred amongst our party, if I except the accident of the canoe-man Henry Petry, who certainly under Mr. Fryer's attention had improved, but was nevertheless found still lingering, and far from being perfectly recovered from his wound.

With the exception of a thermometer, which was broken while being carried with the other baggage over a fall in the Takutu, the instruments which I had with me did not suffer any injury, and the two chronometers (Arnold, No. 6062, and Frodsham, No. 389) presented a good mean rate, which gives me great confidence in the difference of longitude determined between Pirara and the sources of the Takutu.\*

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\* The difference of longitude between Pirara and Tenette was found to be 29° 13' W., by horary angles of the sun; and between Tenette and Pirara, or by measurement,

We were sufficiently recovered from our fatigues to do every honour at our command, at this spot so distant from all civilization, to the birthday of Her Most Gracious Majesty. This was the third which I celebrated at this village, and where the twenty-one guns fired by our small battery told the surrounding Indians that the Paranaghiri had occasion to celebrate that particular day to their heart's content.

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III.—*Extracts from a Journal kept while travelling, in January, 1841, through the Country of the Mamásení and Khógilú (Bakhtiyári), situated between Kázerún and Behbahan.* By **Baron CLEMENT AUGUSTUS DE BODE.**

VON HAMMER has remarked, in his Memoir\* on Persia, that the best geographical account of the road through Khúzistán is the Itinerary of Tímúr's march given in the history of that conqueror, by Sheref-ed-dín 'Alí, of Yezd. But that Itinerary occupies only thirteen lines in the translation of Baron Nerciat. The following notes made during a journey through that country in the beginning of the year 1841 may help partly to complete the account given in the History of Tímúr, and rectify a few errors into which Von Hammer has unavoidably fallen. As the town of Kázerún and the ruins of Shápúr have already been described by preceding travellers, I shall not stop to enlarge upon them, but proceed at once to the country of the Mamásení, a tract almost wholly unknown to European geographers:—

*January 21st, 1841.*—After visiting the cavern which contains the colossal statue† of Shápúr, among the hills bearing that name, and exploring the labyrinth by torch-light, I descended into the valley at 10 A.M., and followed the course of the river of Shápúr upwards in an E.N.E. direction. The stream is here almost choked up with rushes and other aquatic plants.

At 10 h. 45 m. we entered the valley of Kúh-méréh, or Desht-i-Ber, and turned N. This valley lies between the chains of mountains called Pír-i-zen and Kútel-i-Dohter, and may be a farsang or a farsang and a half‡ in width: it is the same valley that is crossed in going from Shíráz to Kázerún, near Miyáneh

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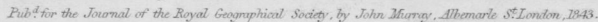
29° 23' W. For the determination of the latter difference I used the mean rate of the chronometers, deducted from horary angles on our departure (March 26th) from Pírra, on our return to that village (May 22nd).

\* Translated into French by the Baron de Nerciat and published in the Paris Geographical Society's 'Recueil de Mémoires,' tom. ii., partie 2de, p. 300.

† Sir Wm. Ouseley's Travels in Persia, vol. i. pl. xix.

‡ About 3½ or 5½ miles. The farsang is from 3½ to 4 miles: perhaps Macdonald Kinneir's estimate (3½) is the nearest (Sir W. Ouseley's Travels, vol. i. p. 11).

By  
Rob<sup>t</sup>.H. Schomburgk.K.R.E.  
May 1842.



*John Arrowsmith.*